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BRITISH MAMMALS

VOL. I



BRITISH MAMMALS

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WITH 50 PLATES IN COLOUR
AND PEN AND INK SKETCHES IN THE TEXT

IN TWO VOLUMES

VOL. I



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PREFACE

THE intention in arranging this work has been to provide pictures in colour of all those animals classed as mammals which inhabit or visit our islands.

Planned as a companion to the volumes on "British Birds" and "A Naturalist's Sketch Book," recently published, it gives a series of reproductions from water-colour drawings of the seventy species which make up the list, and in addition to these are shown various subspecies or closely allied forms, among others some of the local races of mice which have attracted the attention of naturalists during recent years.

Though lacking the brilliant colouring and wonderful singing powers of birds, the four-footed creatures of our fields, woods, and moorlands have each their own charm and attractiveness, from the tiny Harvest Mouse to the wild Red Deer; and as many of them only walk by night, it is no easy task to study their life and habits.

The list of British Mammals is short compared with the much larger number of our native birds; this has allowed more freedom and space in the arrangement of the pictures and enabled me to devote a whole Plate, and occasionally two, to show to advantage some of the more interesting species.

The animals represented belong to the six following orders, namely, twelve Cheiroptera (Bats), five Insectivora (Insect-eating mammals), fifteen Carnivora (Flesh-eating mammals), fourteen Rodentia (Rodents or Gnawing mammals), four Ruminantia (Ruminating mammals), and twenty Cetacea (Whales, Porpoises, Dolphins).

It is not without regret that I have been unable to include pictures of those fine extinct "beasts of the forest," such as the Wolf, the Wild Boar, Giant Fallow Deer, and others, but in order to keep the volumes within a

PREFACE

reasonable size and cost, I have had to content myself with little more than a list of the species which have vanished ; this will be found at the end of the second volume.

In addition to the coloured Plates, which have been reproduced by the Sun Engraving Co. Ltd., of Watford, a number of pen-and-ink sketches have been included as tail-pieces to the letterpress.

Until the late Professor Bell published his "British Quadrapeds," including the Cetacea, in 1837, little was known of the life history of our wild animals, and even then the knowledge of the Bats, Seals and Whales was comparatively meagre ; though a great deal of new and reliable information was supplied in the last edition of that work in 1874.

Since then many notable books and treatises on the subject have been written by various authorities, including among other names of repute those of Sir William Flower, Mr. J. G. Millais, Major Barrett-Hamilton, Mr. J. E. Harting, Mr. Oldfield Thomas, Richard Lydekker, Sir Harry Johnston, R. F. Tomes, E. R. Alston, Dr. W. Eagle Clarke, Mr. T. A. Coward, Mr. Lionel Adams, etc.

A short description of the animals represented has been included, giving the general distribution, colour, measurements, and some notes on the habits of the various species, but for a full and scientific history of the subjects, I would refer the reader to "The Mammals of Great Britain and Ireland" by J. G. Millais, "A History of British Mammals" by the late Major Barrett-Hamilton and Martin A. C. Hinton, and Bell's "British Quadrapeds," 2nd edition, to which I owe much information.

In arranging the classification of the different species, I have followed that of Mr. Millais, in his work already mentioned.

A. T.

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Order CHEIROPTERA—BATS.

FAMILY RHINOLOPHIDÆ.

GENUS *Rhinolophus*.

THE GREATER HORSE-SHOE BAT.

Rhinolophus ferrum-equinum (Schreber).

PLATE I.

In beginning this short description of our British Bats, it would be well to consider first the chief distinguishing features of these animals, by which the different species may be readily recognised.

There are now known to be twelve distinct species inhabiting the British Islands, whilst a few others formerly on the list are now omitted, two having been wrongly identified, and the others apparently immigrants brought over from the Continent of Europe in vessels.

The form of the ear, with its earlet or tragus placed at the doorway of this organ, the shape of the wings and interfemoral membrane, especially the point of attachment of the former at the ankle or toes, and also the number and character of the teeth, are all useful means of identification.

The Greater and Lesser Horse-shoe belong to the group of “leaf-nosed” Bats, so named on account of the curious nasal appendage surrounding the nostrils, with a lancet-shaped extension over the forehead.

These two species are the only representatives of their kind in the British Islands, though many others showing a wonderful variety in the form of the nose-leaf are found in various parts of the world.

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In the Greater Horse-shoe Bat the expanse of wings varies in different individuals, and the females, as in many other species, are larger than the males.

The specimen figured in the Plate obtained in the flesh from Wells, Somersetshire, towards the end of September 1919, measured $12\frac{1}{2}$ inches from tip to tip of wings, but examples occur of larger dimensions, even up to 355 millimetres (about 14 inches), according to the late Major Barrett-Hamilton.

The fur, usually brighter in the females, is a warm tawny grey in colour, and paler on the under parts of the animal. A young one received in September, and represented in the lower part of the Plate, was a soft neutral grey in colour.

The ears are sharply pointed with an outward bend at the tips, while a prolongation of their outer margin crosses in front of the auditory opening in a horizontal direction and forms a conspicuous lobe called the antitragus. The tragus, which is such a prominent feature in the ears of the Vespertilionidæ or typical Bats, is absent in the Rhinolophidæ or Horse-shoe Bats. The remarkable nasal appendage is formed like a horse-shoe in the lower section, from about the centre of this, between the nostrils arises a horn-like protuberance standing out from the face, while above, the frontal leaf narrows to a point over the forehead. The complicated form of this curious ornament may perhaps be best understood by referring to the sketch forming the tailpiece. Nervous and highly sensitive, it is well supplied with glands, and although its true function is apparently not yet fully understood, it is probably a means of communicating to the Bat an impression of its surroundings, independently of the eyesight. The small and deeply set eyes are more conspicuous than in the Lesser Horse-shoe Bat.

The wings are very broad and arise from the tibia just above the ankle, their wide expanse of membrane no doubt accounting for the ease and buoyancy of flight in this species.

THE GREATER HORSE-SHOE BAT

The tail is usually kept in a recurved position over the back and with its membrane does not serve as a pouch when a beetle or other large insect is grappled, as with most other Bats. Mr. T. A. Coward, who has devoted much time to the study of these animals, observed that the Greater Horse-shoe on such occasions uses instead the wing membrane as a kind of bag.

The teeth are thirty-two in number.

The Greater Horse-shoe Bat is widely distributed over the temperate parts of Europe, is found also in North Africa, and ranges eastwards to the Himalayas, China, and Japan. In the British Islands it is distinctly a southern species and unknown in Scotland and Ireland.

It appears to be confined chiefly to the southern and south-western counties in England and to certain parts of Wales. According to Major Barrett-Hamilton (*A History of British Mammals*, part v. p. 230) the most northerly record for England is Whitchurch, near Ross, Hereford, while more to the eastwards specimens have been taken in Berkshire, and Mr. De Winton, as Mr. Millais states, has on several occasions seen it hawking for food in the Zoological Gardens of London. It is fairly numerous in Devonshire, Somersetshire, Gloucester and Hampshire, including the Isle of Wight.

Dr. Latham was the first to discover the Greater Horse-shoe Bat in England, when he captured one in the powder-mills at Dartford, Kent, an account of which was first published by Pennant in the fourth edition of his *British Zoology* in 1776. Kent's Hole, Torquay, has long been known as a resort of this species, and among other places there is a colony under the roof of Wells Cathedral, whence I obtained the specimen for the Plate.

As a retreat, this Bat loves the darkness and obscurity of natural caverns, underground workings in limestone, or sometimes recesses in old buildings. Describing its flight, Mr. Millais says (*Mammals of Great Britain and Ireland*,

BRITISH MAMMALS

vol. i. p. 26-27), "It hunts for its food—moths and flying beetles, especially the fern-chafer—at an elevation of from thirty to thirty-five feet above the ground. In flight, when seen to advantage, this Bat exhibits more grace than power and activity, the characteristics of the Noctule; it sails and flutters with a delicate butterfly flight which is exceedingly attractive. Its broad wing area is noticeable and gives the animal a larger appearance than it actually possesses. In the open air the flight seems slow but full of grace and buoyancy."

With regard to its method of feeding, Barrett-Hamilton states (*A History of British Mammals*, part v. p. 244), "There can now, I think, be little doubt that the Horse-shoes do not, like most other bats, consume their prey when on the wing, but habitually alight to eat it, conveying it for this purpose to certain favourite dining-places within the shelter of the caves.

These, even when the diners are absent, are betrayed by the débris of wings, elytra, and other fragments, as well as by the heaps of excrement which fall to the ground during and after a meal."

The two species of Horse-shoe Bat show a wonderful dexterity in alighting, when in order to perch head downwards they turn a complete somersault.

When hibernating, they hang suspended by their feet, whilst their bodies are almost entirely enshrouded by the wings.

A single young one is born at a time, which is carried by the mother, attached by its teeth to her body. Two have been recorded in Germany.



THE LESSER HORSE-SHOE BAT

THE LESSER HORSE-SHOE BAT.

Rhinolophus hipposiderus, Blanford.

PLATE 1.

Except in size—the expanse of wings measured $8\frac{3}{4}$ inches in the specimen figured in the Plate—this Bat closely resembles the Greater Horse-shoe, and was first discovered in England and shown to be a distinct species by Montagu, who obtained examples in Wiltshire and later in Kent's Hole, Torquay. Compared with its larger relation, two Lesser Horse-shoe Bats, kindly sent to me by Mr. T. A. Coward for illustration in this book, were duller in the colour of the fur, the underparts being of a very pale brownish grey, and above a slightly darker shade of the same.

In colour, the young is similar to the immature Greater Horse-shoe.

The nasal ornaments, though resembling those of the larger species, differ in some respects, as may be seen by referring to the tail-piece sketch.

The eyes are very small and deeply set, more so than in the other, being almost hidden in the fur. The teeth are the same in number.

The Lesser Horse-shoe Bat inhabits Europe as far north as the Baltic territories, ranging southwards to North and East Africa and eastwards to Kashmir.

In the British Islands it is confined to England, Wales, and Ireland, being common in some parts of the latter country.

The only Scottish record is not now considered reliable.

Though recorded from as far north as Ripon, Yorkshire, it is not till we come to the southern and south-western counties of England and various localities in Wales that it becomes more general, and is often found associating with the Greater Horse-shoe in favourable situations.

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Though found locally in some numbers, it can scarcely be called a common species, though it has a much wider distribution than its cousin.

Among other haunts, according to Millais, it frequents Kensington Gardens in London, and owing to the difficulty in identifying the different species, when hawking after their prey in the dusk of evening, this Bat may possibly be less rare than one might be led to suppose.

This frail little creature, which is said to be more delicate than any other European Bat, seldom venturing out unless in calm weather, is difficult to keep in confinement for more than a few days.

To Mr. T. A. Coward and Mr. C. Oldham we owe most of our knowledge of its ways and habits in this country.

In *The Mammals of Great Britain and Ireland*, p. 36-37, Mr. Millais quotes the following account supplied to him by Mr. Coward, "In every case the Bats were hanging: some were suspended from a smooth roof, clinging to minute inequalities, others were at the top of holes in the caves; in such positions the face of the Bat was always turned towards the nearest wall. Both sexes hung in company; the largest gathering consisted of ten Bats. In one water-worn hole a male and female were together, an inch or two apart. When first found the Bats all hung with perfectly straight legs; their ears were partly folded back, and their faces hidden. They noticed the light at once, and began to sway slowly from side to side; then they bent their long legs and drew themselves up, swinging with more vigour. The tail in every case was recurved over the back. . . .

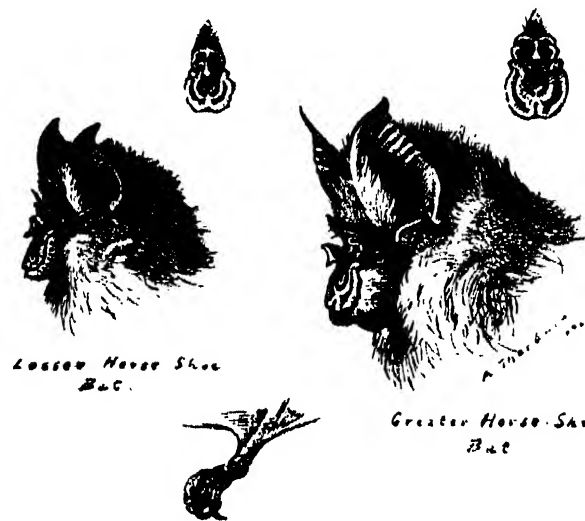
"When alighting after a short flight the agility of the Bat was most noticeable. Most Bats when they alight seize the object on which they are settling with the thumbs, and then rapidly turn round and take hold with the feet. The Horse-shoes, when an inch or so from the object, turn in the air, taking hold at once with the feet."

Like the Greater Horse-shoe Bat, it usually chooses as a retreat dark

THE LESSER HORSE-SHOE BAT

caverns of limestone formation, or recesses in old buildings, hanging with its body almost wholly draped with the wings. Various observers have noticed the marvellous skill with which this species avoids any obstacle during flight.

In Bell's *British Quadrupeds*, 2nd ed. p. 98-99, the late R. F. Toms, describing its powers, says "It literally flew into every part of the room, and behind and under everything, even under a bookcase standing against a wall, although there was scarcely a space of three inches between it and the floor. Some bookshelves in a recess especially attracted its attention, and after examining them diligently, it flew into a vacancy occasioned by the removal of a moderate octavo volume, and again into the open room, without having so much as touched anything with the tips of its wings."



FAMILY **VESPERTILIONIDÆ.**

GENUS **Barbastella.**

THE BARBASTELLE.

Barbastella barbastellus, Schreber.

PLATE 2.

In the opinion of Professor Bell (*British Quadrupeds*), the Barbastelle appears to form a link between the Horse-shoe and the Long-eared Bats. It has only one near ally, namely *B. darjilingensis*, inhabiting the Himalayas.

The wings are fairly broad and measured from tip to tip when expanded $10\frac{1}{8}$ inches in a specimen captured by myself, but larger examples are given by Major Barrett-Hamilton.

The ears, a distinguishing feature in this species, are rather broad and roughly square-shaped, nearly touching each other on their inner margins which arise from the middle of the forehead.

The tragus is large, reaching more than half-way up the ear, and has a protuberance near the base of its outer margin. The lower leg is comparatively long, allowing a large interfemoral membrane, whilst the feet are small.

The fur is soft and fine, conspicuously dark, almost black in colour, but having a hoary appearance especially on the flanks, which are tinged and frosted with grey. The ears, face, and wing membranes are dusky black. Millais mentions a form of a deep red-brown in colour.

The teeth are thirty-four in number.

THE BARBASTELLE

The Barbastelle is not uncommon in France, where it was first discovered by Daubenton in 1759, and is also found at a considerable height among the Swiss Alps. It ranges from as far north as southern Scandinavia, southwards to North Africa, whilst eastwards its habitat extends far into Asia.

Sowerby first recognised it as a British species from an example obtained early in the nineteenth century at Dartford, Kent.

The Barbastelle is locally distributed, and apparently by no means abundant anywhere in the British Islands, and as far as known is confined to England and Wales. It has often been recorded in the more southern parts of the kingdom, but north of the Wash it appears to be very rare, though two specimens were taken in Cumberland near Carlisle.

Describing its habits Mr. Millais writes (*Mammals of Great Britain and Ireland*, vol. i. p. 43): "Certainly the two specimens which I observed and one of which I shot at Horsham were hawking for food at 9 p.m. in June and July; they flew very low, and with uncertain irregular flight. This Bat can be recognised by this flight—slow and erratic—as well as the exceeding black colour of the pelage; but if in the hand it cannot be confused with any other species, for the ears, springing from the centre of the forehead, are a character which distinguish it from all the other British Bats excepting the long-eared Bat, whose abnormally long ears, however, prevent confusion."

It was formerly thought to be more or less solitary in disposition and habits, but later information shows that this is not the case, as many instances have occurred showing its gregariousness and sociability. Various situations are chosen as a retreat, including crevices in ruins, under the loose bark of trees, or dark crannies in caves.

I have only once had an opportunity of watching the Barbastelle in life, when at Hascombe, Surrey, in July 1902, one flew into my room one night, and after some difficulty, as it showed great dexterity in dodging and twisting, I succeeded in catching it.

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GENUS **Plecotus.**

THE LONG-EARED BAT.

Plecotus auritus, Linnæus.

PLATE 2.

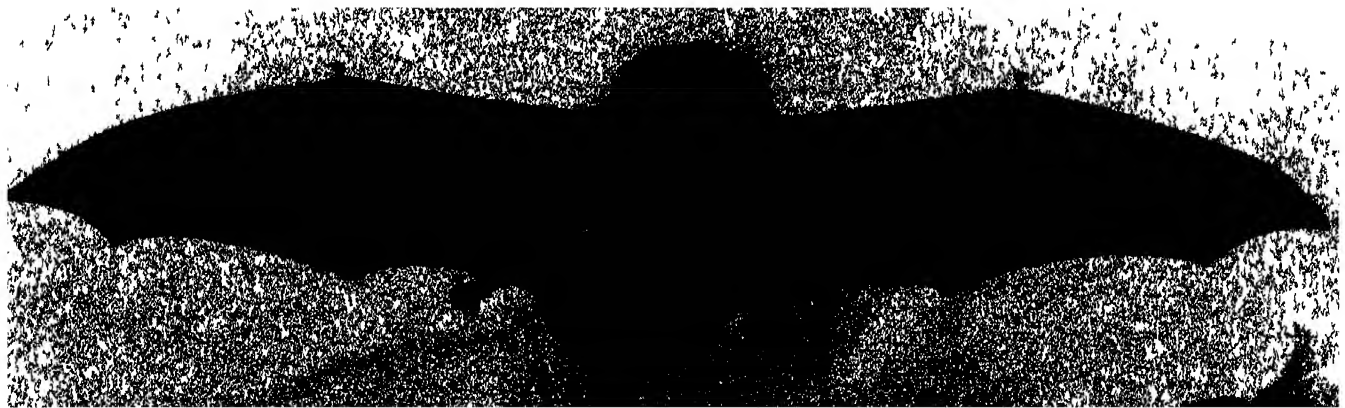
This Bat may be easily identified at any time by the abnormal size of the ears, which measure about $1\frac{1}{2}$ to $1\frac{3}{4}$ inches and are nearly as long as the head and body combined. The tragus is large and very conspicuous when the animal is at rest, as it then points outwards, while the ears are folded backwards as shown in the sketch in the Plate, which was taken from life. The expanse of wings is about ten inches.

When the little creature is hanging head-downwards and asleep in the daytime or during hibernation, the projecting tragus may easily be mistaken for the ear, as the latter is then entirely hidden and folded beneath the forearm.

The eyes are fuller and more conspicuous than in our other Bats, and according to Millais it does not seem to be so sensitive to light as some of the other species.

The feet are large, and the rather long tail projects slightly beyond the membrane. In the adult, the colour of the upper parts is a dull brown, the chest and belly a pale whity-brown, these colours being darker in the young. The teeth are thirty-six in number.

The range of the Long-eared Bat extends over a great part of Europe, and in Asia as far east as China. It also inhabits North Africa. It is found over the greater portion of the British Islands, being common in many



THE LONG-EARED BAT

localities in England and the Lowlands of Scotland. It is rarer in the Highlands of that country, though it has been found in many places as far north as Sutherland and Inverness-shire.

Mr. Millais says it is common about Perth and Dunkeld, and he once obtained one on North Uist, Outer Hebrides.

I have seen one which was picked up in my presence on the railway line at Pitlochry.

It has also been recorded in the Isle of Man, and is abundant in Ireland.

The Long-eared Bat is partial to wooded districts, where it seeks its food of moths and other insects among the foliage and blossoms of trees, often picking them off the leaves.

Dr. N. H. Alcock and Mr. C. Moffat, writing in the *Irish Naturalist* (December 1901), thus describe its habits, "To observe this Bat on the wing, it is a good plan to wait at dusk under some tree whose foliage is not too dense to be seen through—an ash is probably the best that can be selected—and watch for its appearance among the branches overhead. From about thirty to thirty-five minutes after sunset, its figure may, almost any summer evening, be thus detected against the sky, gliding and hovering in a stealthy manner among the outer sprays of the tree. It threads its way with a beautiful facility among the twigs and leaves, often seeming rather to swim than to fly, so slight is the visible movement of the wings. Poising at times like a humming bird, it appears to be picking something from the leaves; at other times it suddenly plunges into the middle of a spray, and remains for several seconds clinging to the twigs, no doubt securing or eating some insect. It is not uncommon to see one ash tree occupied at the same time by five or six of these Bats—though each comes and departs by itself—all gliding in the same noiseless and lemurine fashion among the leaves, and all to the casual bystander practically invisible. The long ears are often thrown

BRITISH MAMMALS

forward so as to resemble a proboscis, and may be distinctly seen if the observer is posted immediately below the Bat."

From observations made by various naturalists, the long-eared Bat appears to hunt for prey throughout the whole night, when it can often be recognised by its high-pitched notes.

The specimen shown in the plate was taken while hibernating under the roof of a neighbour's house where two others were obtained at the same time.

They are also fond of caves as a winter resort, where as far as I have noticed they usually hibernate apart, though other species may inhabit the same cavern.

I have found this so when visiting Mr. Heatly Noble's cave near Henley-on-Thames and in another resort used by different species near Godalming. This Bat is easily tamed, and takes more readily to confinement than others.

THE SEROTINE

GENUS *Vesperugo*.

THE SEROTINE.

Vesperugo serotinus, Blasius.

PLATE 4.

This large species, which approaches and sometimes equals the Noctule or Great Bat in size, measures in expanse of wings from about 12 to 14½ inches. The ears are broad with rounded tips, the outer margin terminating in a lobe near the corner of the mouth.

The tragus is larger than in the Noctule and Pipistrelle and ends in a rounded tip. The face, except for a few hairs arising from the glands, is bare.

Compared with the Noctule, the wing is broader, the calcarial lobe very small, and the tip of the tail projects noticeably beyond the interfemoral membrane.

There are thirty-two teeth.

The fur on the back is a rich dark brown in colour and silky in texture, the under parts being paler and greyer.

Of all our Bats, the Serotine appears to have the greatest geographical range, being widely spread over Europe, Asia, Africa and America, and also distinguished in this respect that it is the only species indigenous to both Hemispheres.

In the British Islands it is rare except in a few favoured districts in the southern, and especially the south-eastern, counties of England. Mr. Millais, in his *Mammals of Great Britain and Ireland*, mentions Kent

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as the only county in which it may be said to be common, giving Yalding as a locality where it is numerous, the other places mentioned being Folkestone, Maidstone, Canterbury, Riverschurch, Charlton, Waldershare, Dartford, and Wingham.

It has rarely occurred north of the Thames, two or three having been recorded from Essex; and in *The Zoologist* (1892, p. 403) Mr. Coburn mentions a specimen from the neighbourhood of Birmingham.

The Serotine was first described by Daubenton in 1759. Its manner of flight, as described by various observers, appears to differ according to the kind of prey in season, or the state of weather prevailing at the time, as it seems averse to cold and damp. At times it flutters through open spaces sheltered by trees, feeding on cockchafers and other insects, and at others flies high aloft, frequently swooping obliquely downwards in a sudden dive in an effort to secure some insect at a lower level than itself.

The same characteristic dive may also often be noticed in the Noctule.

The late Major Barrett-Hamilton, describing their flight as witnessed at Yalding, says (*A History of British Mammals*, part iii. p. 136):

“They now flew higher, often at thirty or forty feet, but not, I think, exceeding the height of tall elms or of gunshot, and often descending near to the ground. Their flight was not unlike that of the Pipistrelle, but their beat was wider and their pace relatively less rapid. They could not be described as weak fliers, nor was their pace slow, but they clearly lacked the dash and finish of the Noctule, one or two of which were present for comparison.” He also states (p. 137), “Despite its name, the Serotine is an early flier, perhaps the earliest of all British Bats.”

This species evidently does not fly throughout the whole night, but for how long does not seem to be known precisely. It is sociable in its

THE SEROTINE

habits, small parties usually assembling under the roofs of houses or in the hollows of old trees where they retreat during daylight. Hibernation appears to last from October till April.

According to Continental observers a single young one is born at a time.

THE PARTI-COLOURED BAT.

Vespertilio murinus, Linnæus.

This species was one of those formerly included in the British list, but has now been removed, as the two specimens recorded, one by John Hancock, found on board a ship in Yarmouth Roads, and the other, taken at Plymouth by Dr. W. E. Leach, are supposed to have been brought over in vessels from the Continent of Europe.

BRITISH MAMMALS

THE NOCTULE, OR GREAT BAT.

Vesperugo noctula, Keyserling and Blasius.

PLATE 3.

The Noctule or Great Bat, about the largest of our British species—the Serotine and Greater Horse-shoe alone approaching or equalling it in size—measures in expanse of wings from 13 to 15 inches.

The forehead is broad and low, the muzzle prominent and bulbous, so much so that the eyes are hidden in a full-face view of the head. The nostrils are surrounded by a projecting ridge, the ears set widely apart are broad and rounded, their outer margins extending to below the corner of the mouth. The tragus is short, broad, and rounded at the top.

The jaws strong and wide and furnished with powerful teeth, thirty-four in number.

The wings are long, but narrower than in the Serotine and have usually a tract of fine golden hair below the forearm.

The tail projects very little beyond the interfemoral membrane, and the post-calcarial lobe is large.

The fur, which is very soft and silky in texture, is a fine golden brown in colour, with little difference in the shade of the upper and lower parts. The animal has a disagreeable musky odour.

A specimen obtained in October shortly before hibernating, and figured in the Plate, had become very fat, in preparation for its winter sleep.



THE NOCTULE, OR GREAT BAT

The Noctule has a wide distribution over the temperate parts of Europe and Asia, and also inhabits North and East Africa.

In England it is more or less common in various localities in the southern, western, and midland counties, and also in Yorkshire, though very rare in Durham and Northumberland.

In Wales it is plentiful.

No authentic examples had been obtained in Scotland till October 13th, 1904, when, as recorded by Mr. Millais (*Mammals of Great Britain and Ireland*, Appendix iii.), one was shot at Dalguise, Perthshire, by Mr. Charles Eversfield. Another was obtained at Duffus, Elgin, on October 1st, 1909, while some more are said to have been observed near Elgin and Lhanbryde (*Ann. Scott. Nat. History*, 1910, 52-53). There seems to be no authentic record of the occurrence of this species in Ireland.

The Noctule was first detected on the Continent of Europe by Daubenton, and described by him in 1759. Later, in 1771, it was discovered by Gilbert White at Selborne, who obtained two examples in the summer of that year, and gave an accurate description of the animal, which he appropriately named *vespertilis altivolans*, from its manner of feeding high up in the air.

Throughout the year this species is sociable in its habits, large numbers congregating in holes in trees or under the roofs of buildings, the latter being generally used for winter quarters, while in summer, tree-holes are more favoured. Bell, quoting Pennant, states that the Rev. Dr. Buckhouse saw one hundred and eighty-five taken in one night from the eaves of Queen's College, Cambridge, and Mr. Millais, in his *Mammals of Great Britain and Ireland* (vol. i. p. 64), says: "Near Cambridge and at Frostendon in Suffolk, I have seen large numbers on the wing at the same time. When residing at the latter place in 1883 and 1884 I was much struck with the immense numbers of Noctules which lived in some

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old oaks in the Rev. E. Hickling's grounds ; so many as two hundred might be seen on any fine evening in the summer flying above a small meadow only about three acres in size."

The winter sleep of the Noctule usually lasts from late October until March and early April, though on occasions it has been seen abroad in the months of November, December and February.

The flight of this Bat is swift and powerful, and on fine summer evenings is usually maintained at a high altitude. At other times, probably depending on the state of the weather, the flight is much lower and often quite near the ground or over some sheet of water.

Like the Serotine, this species, when pursuing its prey, frequently makes that sudden and characteristic plunge already referred to.

Mr. Millais has noted that Noctules often change their hunting-ground, and that a colony may be seen one evening feeding in the immediate neighbourhood of their home-tree, and on another hawking over a meadow more than a mile and a half away.

A great deal has been learned of late years of the habits of this species from the observations of Messrs. Coward, Millais, Oldham, Steele, Elliott, and others, which shows that the evening flight only lasts about an hour, when the Bats retire to their dens, emerging again later to continue their hunt till shortly before dawn.

When at rest or in the act of pouncing an insect the tail of the Noctule is bent forwards under the body, when in flight it is usually held straight out or curved a little downwards.

The food consists mainly of large flying beetles, which the Bats eat while on the wing, nipping off the strong wing-cases with their powerful teeth.

Mr. Oldham, describing the habits of this species (*Zoologist*, 1901, pp. 51-59), says : " As the light fades, the Bats descend to a lower



Serotine

Leisler's Bat

THE NOCTULE, OR GREAT BAT

level, and feed at a height of from fifteen to thirty or forty feet above the fields, pools, and open places in the woods. The crunching of their jaws as they masticate their insect prey may then be heard distinctly."

Wolley describes the cry of the Noctule as a "cricket-like chirp."

LEISLER'S BAT.

Vesperugo Leisleri, Keyserling and Blasius.

PLATE 4.

This species, called by Bell the Hairy-armed Bat, on account of the band of hair extending below the forearm on the under surface of the wing, is intermediate in size between the Pipistrelle and Noctule, and measures about 12 inches in expanse of wings.

In general, the form and character of Leisler's Bat resembles the Noctule's, though less lusty and robust. The feet and legs are comparatively smaller and more slender, and the calcarial lobe also not so large. The teeth are thirty-four in number.

On the upper parts the colour of the fur is a deep brown, the lower greyish brown.

Mr. A. Whitaker, who has had exceptionally good opportunities of studying this species alive, thus describes it in *Wild Life* (February 1914, p. 79). "To my mind, however, the most satisfactory means of distinguishing between these two Bats is afforded by the fur of the Noctule becoming uniformly paler towards the base, while in the species we are considering the reverse is the case, the hairs, especially those of the underparts, being almost black at the roots. By rubbing up the fur of the underparts the wrong way, this distinction is made apparent even in a casual inspection."

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This Bat was first discovered by the German naturalist Leisler and described by Kuhl in 1819.

It inhabits Europe and Asia, where it ranges eastwards to the Himalayas.

In Great Britain, as far as at present known, its range seems very limited.

The late R. F. Tomes, in Bell's *British Quadrupeds* (2nd ed. p. 27), notes "its not unfrequent appearance at various localities in the course of the river Avon, in the counties of Warwick, Worcester, and Gloucester." Besides these localities it has been recorded from Cheshire by Mr. T. A. Coward (*Zoologist*, 1887, p. 169), whilst in the West Riding of Yorkshire it appears to be plentiful near Barnsley.

In Ireland it is a common Bat in many parts of the country, where it takes the place of the Noctule.

Mr. Whitaker, in the article already referred to in *Wild Life* (p. 79-80), says "these bats may be seen hawking for food on mild evenings throughout the whole season, spring, summer, and autumn. . . .

"They fly along the low edge of the plantation and often make digressions to a couple of large ash trees growing in an isolated position on the boundary of my garden. Round and round these they will circle with great persistence, snapping up moths, and doubtless other insects also, whenever they flutter out a few feet from the shelter of the foliage. Their flight is stronger and more direct than that of the Pipistrelle, and usually at about twice the altitude; on the other hand it is not quite so high or strong as that of the Noctule." The earliest and latest dates on which he noticed the Bats abroad were March 3rd and November 9th.

Leisler's Bat is a tree-haunting species, choosing for its den some cavity in the trunk or branches, where it associates with others of its species during the summer months. In winter, when hibernating, it is said to keep apart from its fellows.

LEISLER'S BAT

From careful observations made by Mr. Moffat in Ireland, as quoted by Major Barrett-Hamilton (*A History of British Mammals*), Leisler's Bat does not fly throughout the night, the evening and morning flights lasting a little more than an hour each.

The voice is sharp and high-pitched.

THE PIPISTRELLE OR COMMON BAT.

Pipistrellus pipistrellus, Schreber.

PLATE 3.

The expanse of wings in this species averages about 8 inches. The ears are rather oval and comparatively narrower than in the Noctule and Leisler's Bat, the tragus barely half the length of the ear and rounded at the tip. The feet small ; teeth thirty-four in number. The colour is usually reddish-brown on the upper parts, a little paler below, but some examples are of a much deeper tint, the darkest I have seen being a dull sooty black.

The Pipistrelle inhabits the temperate parts of Europe, ranging as far as Kashmir in Asia, and also to North Africa.

It is more or less plentiful all over the British Islands, in Scotland occurring as far north as the Orkneys and westwards to the Outer Hebrides. Dr. Eagle Clark mentions a pair which he observed at an altitude of 1300 feet at Corroul Lodge, Inverness-shire (*Scottish Naturalist*, December 1917).

It is also plentiful in Ireland.

This species was considered by Pennant, and others who followed him, to be identical with the common Bat of Continental naturalists, namely the mouse-coloured Bat, *Vespertilio murinus*, which is a much larger animal and not now recognized to be British. The Rev. L. Jenyns was the

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first to dispel this confusion and show that our common Bat is the Pipistrelle, which also occurs in Europe.

There are few parts of the country where on fine summer evenings between "the gloaming and the mirk" this little creature, the smallest of our Bats, may not be seen. With rapid wing-beats it flits along country lanes or threads its way around trees or buildings in search of various small insects, especially gnats, which form its chief food.

Like other Bats, it shows little fear of man, and will circle closely round one's head. The Pipistrelle usually selects some likely beat for the evening hunt, returning to the same spot for many nights in succession.

According to Mr. Moffat (*Irish Naturalist*, 1905, p. 101-103) it appears to hunt for its prey throughout the whole night, retiring to its den shortly before sunrise.

It is fond of the neighbourhood of ponds and rivers and drinks like other Bats by sipping the surface of the water as it flies.

The Pipistrelle awakes from its winter sleep earlier than most of its relations, generally appearing on the wing about the middle of March if the weather be fine, and retiring in October or November.

Though this is the general rule, it may be tempted out at almost any time in the winter if a mild spell sets in.

Various situations are chosen as retreats, roofs of cottages, churches, and other buildings, cavities in walls or under the bark of old trees.

In confinement, this species will readily take its food, eating flies or meal worms with avidity, and if any prey be too large to master with its mouth, the tail membrane is used as a pouch.

DAUBENTON'S BAT

GENUS *Myotis*

DAUBENTON'S BAT

Myotis Daubentoni, Leisler.

PLATE 5.

The distinguishing features of this species, by which it may be known at any time from Natterer's Bat, are the shorter ears and tragus, large feet, the projection of the two last tail vertebræ beyond the interfemoral membrane, and the tiny lobe succeeded by a notch on each side of the latter near the tail.

It differs from the Whiskered Bat, not only in the greater size of the feet, but also in the attachment of the wing membrane, which starts from the ankle and not from the base of the outer toe, as in the other.

The expanse of wings in Daubenton's Bat is about .9 inches, occasionally more.

The ears are of medium size with rounded tips, and the tragus, which is straight and pointed, measures about half their length.

The glands are conspicuous on the muzzle, which is fringed with hairs. The teeth number thirty-eight. In colour the upper parts are a glossy umber brown, below pale brownish-grey.

This Bat inhabits Europe and Asia from Scandinavia and Russia to the Mediterranean countries, while eastwards it reaches Japan.

Though known to Leisler and Kuhl on the Continent of Europe, Daubenton's Bat was not fully identified as a British species till Bell described it in the first edition of his *British Quadrupeds* in 1837.

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The belief that it was a rare species in the British Islands is now known to be without foundation, as it is common, and probably always has been, in places suited to its water-loving habits.

Gilbert White, writing to Pennant in 1767, mentions having seen some years before that date, "myriads of bats" between Richmond and Sunbury, and that "the air swarmed with them all along the Thames"; these masses are most likely to have consisted chiefly of Daubenton's Bats.

Another favourite haunt is Christchurch, Hampshire, where Mr. Borrer found it in abundance in 1874, and according to Mr. Millais "it is just as common now."

The late R. F. Toms in Bell's *British Quadrupeds* (2nd ed. p. 62) says, "We have sometimes seen these Bats so thick on the Avon, near to Stratford, that at certain spots there could not have been fewer than one to every square yard."

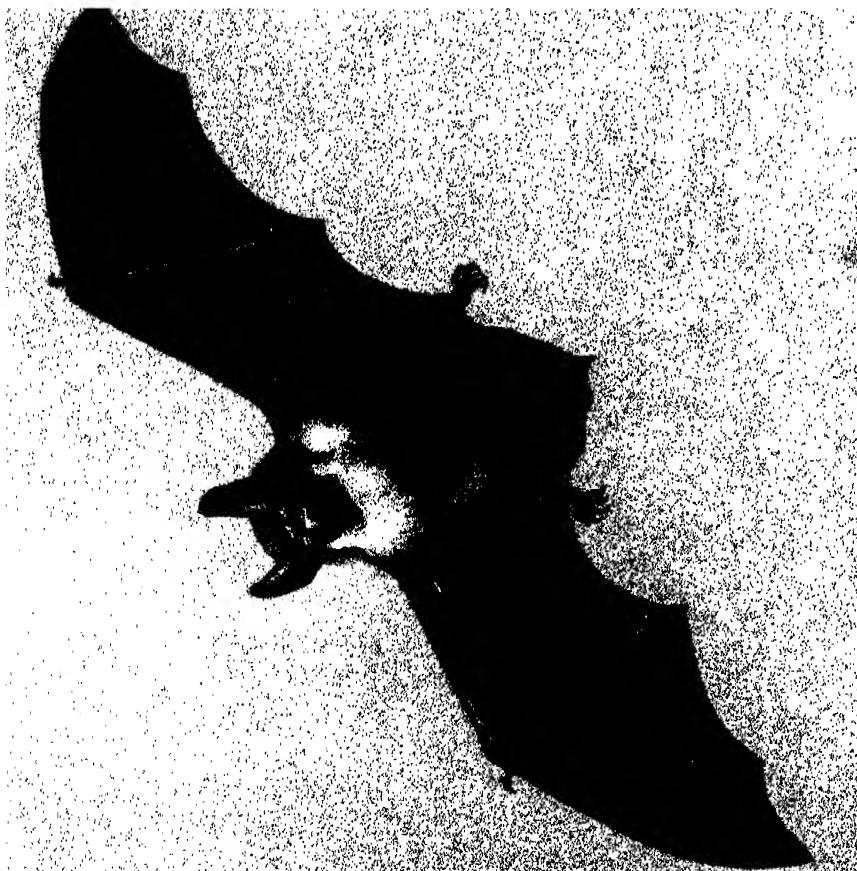
It is plentifully distributed throughout the greater part of England and Wales, and is also common in various localities in Scotland, where, according to Dr. Eagle Clarke (*Ann. Scott. Nat. Hist.* 1892, p. 266), it has been recorded as far north as Fochabers on the Spey.

It also appears to be widely spread over Ireland.

This species has been aptly called the 'Water Bat,' by Major Barrett-Hamilton, who thus describes its habits (*A History of British Mammals*, part iii. p. 149): "So peculiar are the vespertinal habits of this species, that, although it is locally abundant, an ordinary observer may be quite unconscious of its existence. It is essentially aquatic, if such an expression be applicable to an animal which never enters the water. It haunts that element continually, flying so close to it that it is difficult to distinguish between the creature itself and its reflection."

I had not come across this Bat in Surrey until this spring (1920), when in February, requiring specimens for the Plate, I made several





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below greyish white. The bases of the hairs above and below are very dark.

This species is found throughout the greater part of Europe, and according to Barrett-Hamilton, ranges in Asia to Japan, where it is represented by a sub-species.

In England and Wales, there are few counties where it has not occurred, being common in some localities. Across the border in Scotland it is hardly known, the only reliable evidence of its occurrence there is a specimen in the British Museum from Inveraray, Argyll, while a skin in the collection of the late Robert Grey was supposed to be from Midlothian.

There are various records for Ireland.

Natterer's Bat is fond of well-watered woodland country and is sociable in its habits.

The late R. F. Tomes, writing in Bell's *British Quadrupeds* (2nd ed. p. 55-56) describes a colony found under the church roof at Arrow, near Alcester; here the Bats were clustered in a mass three or four inches thick, six or seven wide and about four feet in length, while a constant movement was going on, as those on the outside endeavoured to push their way inwards, probably for warmth.

As a winter retreat, Natterer's Bat shows a partiality for caves. Mr. Heatley Noble tells me it is common near Henley-on-Thames, where it hibernates in a cave in the chalk.

Near Godalming, Surrey, in the cavern already referred to in the account of Daubenton's Bat, I have found it on several occasions hibernating in the vaulted roof. They were all separately lodged in deep crevices among the stones, and sometimes entirely hidden from sight. When disturbed, they uttered a peevish chattering squeak. Two of these, which I kept in confinement for a few days, were very gentle in their

NATTERER'S BAT

habits and usually slept in their cage closely touching each other in the darkest corner they could find.

They became very vigorous when wakened by the warmth of a room and if let out would fly for a considerable time, showing a marvellous skill in turning and twisting as they searched every corner in the hope of finding an outlet. The tail, as far as I could discover, was usually held straight out, but occasionally would be slightly curved downwards. They showed no fear as they circled at times round my head, at others quite low down by my feet. Although they would sometimes attempt to bite when handled, their delicate teeth did not appear to be capable of penetrating the skin.

Natterer's Bat is fond of hawking for its food over pools of water like Daubenton's Bat, but, according to Mr. Millais, it feeds at a greater elevation than the other. It appears to prey on gnats and similar insects, but the only food I could persuade my captives to take was milk.

BECHSTEIN'S BAT.

Myotis Bechsteini, Leisler.

PLATE 6.

This rare species, though resembling Natterer's Bat in colour, may always be known by the much larger ears, the comparatively shorter tragus and the absence of the fringe of short bristles on the interfemoral membrane.

The wings, arising from the base of the toes, measure about 11 inches from tip to tip when expanded. Mr. Millais, who was fortunate enough to capture one alive in Mr. Heatley Noble's cave near Henley-on-Thames on March 1, 1901, says (*Mammals of Great Britain and*

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Ireland, vol. i. p. 97-98): "It is reddish brown above, the hair being parti-coloured, lighter at the tips and pale grey beneath, though not quite so light as in *M. Nattereri*. By far the most striking feature, and one which even a casual observer may note, is the size and shape of the ears. They first bend outwards at an angle of 78° , and then turn upwards to the perpendicular, ending in a rounded point."

The teeth are thirty-eight in number. As far as is known, this species is confined to Europe, where it ranges from Scandinavia to Italy and Spain. It has only rarely been taken in England and was first recorded in the New Forest, where Millard obtained a specimen, now preserved in the British Museum, more than eighty years ago. Again in the New Forest, Mr. E. W. A. Blagg found a party of fully a dozen in a Woodpecker's hole in July 1886. Of these he kept two and later gave them to the British Museum. The next recorded was one shot by Mr. W. C. Ruskin Butterfield near Battle, Hastings, on July 28, 1896. Next comes Mr. Millais' specimen from Henley-on-Thames and two more were obtained by Mr. Percy Wadham near Newport, Isle of Wight, on July 31st and August 14th, 1909. This completes the list of those captured in the British Islands, as far as I know.

Little appears to be known of the habits of this fine bat. In Germany it is said to inhabit holes in trees and to hibernate under the roofs of houses. Its flight, beginning late in the evening, is stated to be slow and at a low elevation.

Mr. Millais' specimen was discovered in a crevice in the chalk of the cave, in which were found at the same time several other species. I am indebted to him for kindly lending me a photograph of this example, taken shortly after death, from which I have been able in the Plate to show the correct form of the ears.



Beckstein's Bat.

Whiskered Bat.

WHISKERED BAT

WHISKERED BAT.

Myotis mystacinus, Leisler.

PLATE 6.

The Whiskered Bat, scarcely larger than the Pipistrelle, measures in expanse of wings $8\frac{1}{2}$ inches. The short and rather stumpy face and muzzle, nearly black in the colour of the naked parts, are bushy with the numerous fine hairs which conceal the eyes, while the hairy fringe on the upper lip accounts for the name of this species.

The dusky black ears are rounded at the tips and notched on their outer margin. The tragus, measuring fully half the length of the ear, ends in a blunt point. The wings arise from the base of the outer toes, while the tail projects slightly beyond the membrane. The teeth are thirty-eight in number.

The colour of the hair tips on the upper parts of the body is a pale brown, on the under parts dull grey, the bases of the hairs above and below a dusky black. I am indebted to Mr. T. A. Coward for the specimen figured in the plate, which was taken while hibernating early in February. This Bat was extremely dark in colour and a typical example of the species in its winter coat.

The Whiskered Bat is widely distributed over the Continent of Europe, from as far north as Scandinavia and Russia southwards to France and Spain. In Asia, it reaches China, Sikkim and Nepaul, and also occurs in North Africa.

In the British Islands the Whiskered Bat was formerly considered rare, but this belief was no doubt owing to the lack of observation and the

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difficulty of distinguishing this small species when on the wing from the Pipistrelle or Common Bat.

More recently the alertness of various naturalists has shown that it is plentiful in some localities.

In England it is numerous in various parts of the southern, western and midland counties, and also in Yorkshire, though rare or absent in East Anglia, Durham and Northumberland. In Wales it is not uncommon.

There are only two records of its capture in Scotland, namely, one near Rannoch, Perthshire, in June 1874, and another at Dunbar, East Lothian, 20th March, 1893. It is widely distributed in Ireland.

The habits of the Whiskered Bat seem to have been less closely watched than those of most of the other species inhabiting our islands. It has been supposed to be less sociable in its manners than others, though R. F. Toms (*Vict. Hist.*, 'Worcester') mentions a colony of more than a hundred in the roof of his house at Littleton. It often frequents the neighbourhood of rivers, where it has been observed seeking its prey among the branches of trees or flitting over the surface of the water, while it is said to have been more often noticed hawking during daylight than other species.

Order INSECTIVORA—INSECT-EATING MAMMALS

FAMILY **ERINACEIDÆ.**

GENUS **Erinaceus.**

THE HEDGEHOG.

Erinaceus europæus, Linnæus.

PLATE 7.

The list of the British Insectivora or insect-eating mammals is comparatively short, namely the Hedgehog, the Mole, and three species of Shrews. The Hedgehog or Urchin, whose length from nose to root of tail varies from about 8 to 10 inches, is common in many country districts. The armour of strong prickly spines covering the greater part of the body is so controlled by muscular action that when required the sharp points can project in almost every direction, while the head and other vulnerable parts may be quickly withdrawn under their protection. The spines, yellowish white in colour, with a dark band towards the points, are closely set in the tough skin, and under normal conditions, as when the animal is in movement, they follow the line of the body and lie pointing backwards.

A covering of stiff pale-brown or whitish hairs clothes the other parts of the body. The snout and face are dark, especially round the eyes.

The spiny coat affords such effective protection when the animal is tightly curled into a ball that few enemies care to tackle it, though a high-couraged terrier, in spite of severe punishment, will force an entrance, while the Fox and Badger are also able to overcome it. It is not known

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how the two latter animals manage to do this. Mr. Millais considers (*Mammals of Great Britain and Ireland*) that they may employ the same method as a dog he once met with, which, in attacking, worked with the nails of the forepaws until he got one of the latter fixed against the chest of his quarry "while with the other he drew up the head and forced it back. Then he gave one nip and the tragedy was over."

The cries of a Hedgehog when attacked by a Badger are said to be pitiful (*Field*, March 23, 1875).

Referring to the strength and elasticity of the Hedgehog's armour, Bell in his *British Quadrupeds* (1st ed. p 77) says, "I have repeatedly seen a domesticated Hedgehog in my possession run toward the precipitous wall of an area and without hesitation, without a moment's pause of preparation, throw itself off, and contracting at the same instant into a ball, in which condition it reached the ground from a height of twelve or fourteen feet : after a few moments it would unfold itself and run off unhurt." I have noticed similar tactics while sketching one of these animals placed on a table, when it would often throw itself over in order to reach the floor.

The shortness of the legs causes a characteristic creeping action in the movements of the Hedgehog, as he makes his way hither and thither in a somewhat stealthy manner after the beetles and other insects which form the chief part of his food.

This animal is widely distributed over Europe from Scandinavia and Russia to the Mediterranean Countries, and in Asia reaches eastwards as far as China.

It is plentiful throughout the greater part of the British Islands, and though scarce in the Northern Highlands of Scotland has been recorded by Dr. Eagle Clarke at an altitude of 1400 feet in Inverness-shire (*Scottish Naturalist*, December 1917). It is common in Ireland.

The Hedgehog is more or less nocturnal in its habits, though often coming out to feed in the open about sundown and occasionally earlier in the day.



THE HEDGEHOG

It takes little notice of human beings unless closely approached or touched, when, trusting to its strong defensive covering, it makes no effort to escape.

Its food is very varied, consisting of insects of different sorts—grasshoppers I have found to be peculiarly attractive—worms, small mammals, and young birds.

It is also said to prey on the viper and common snake and to possess immunity from snake-poison.

The Hedgehog usually retreats for hibernation about the end of November or beginning of December, though it may appear again at intervals during the winter.

One I found asleep on December 24, 1918, was beneath a bramble bush in a copse, where in a slight hollow in the ground it had prepared a bed of leaves and grass which entirely covered the animal.

It seemed to resent disturbance, as on visiting the place some days later I found the occupant had gone.

The Hedgehog usually breeds twice in the year, about four or five young being born at a time. Gilbert White observed that they are quite white at first, possess little hanging ears, and can in part draw their skin down over their faces, though unable to contract themselves into a ball.



FAMILY TALPIDÆ.

GENUS *Talpa*.

THE COMMON MOLE.

Talpa europæa, Linnæus.

PLATE 8.

Living an almost entirely underground life, the form of the Mole is wonderfully adapted for this kind of existence, the elongated flexible snout, cylindrical body, and great muscular power of the forearm and hand enabling it to make its subterranean galleries with great ease and speed.

The hands or forefeet, armed with strong claws, usually turn outwards from the body, but can when required bend downwards with their palms towards the ground if used to hold a worm. The hind feet, compared with the hands, are small and weak. The eyes, extremely minute, are hidden by the surrounding fur, and the question whether they are used by the animal has been often raised. Yet the Mole when above ground seems to have some glimmering of sight. One I kept alive for a day or two when making sketches for the Plate would sometimes slightly raise its head, at the same time partly opening out the fur concealing the eyes, these appeared as tiny black dots on the naked skin.

No external part of the ear is visible.

The tail, measuring slightly more than an inch in length and clothed with bristly hairs, is cocked upwards when the animal is excited. The

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THE COMMON MOLE

soft and velvety coat is wonderfully adapted to prevent any soil from lodging in the fur, which arises perpendicularly from the body and can bend either backwards or forwards, according to the movements of the animal in its tunnel.

The colour is a soft deep black with a silvery sheen, the under part of the chin and belly suffused with a yellowish tinge.

Our Common Mole inhabits Europe from Sweden and Russia to the central parts of France, while south of the Alps and in the Mediterranean countries its place is taken by a closely allied form.

Throughout England, Wales and Scotland it is abundant in suitable localities, and in the latter country has been recorded in the hilly districts at an altitude of over 2000 feet as well as among the sandhills by the sea. I have observed it on the surface of the ground routing amongst gravel and heather by a stream high up on a Highland deer-forest, while there are few places provided with a good supply of earthworms where the Mole may not be found, as these supply its favourite food. The larvæ of insects, small mammals, reptiles, and even the flesh of its own kind are also eaten.

It is absent in many of the Scottish islands, including the Shetlands, Orkneys, and Outer Hebrides, and also in the Isle of Man and Ireland.

Most people are familiar with the little earth-mounds which are raised by the Mole when removing the earth from the tunnels as it burrows in search of its prey.

The first systematic study of these runs and the fortress or breeding stronghold was made by the Frenchman, Henri le Court, towards the end of the eighteenth century, and since then many other observers, especially Mr. Lionel Adams and Mr. W. Evans, have added much to our knowledge. From the fortress a main underground thoroughfare passes through the territory occupied by the Moles, whence branch many by-ways

BRITISH MAMMALS

used when hunting for worms. The ground occupied by the female is said to possess no chief highways, having only runs branching in various directions. Within the breeding stronghold or nursery is placed the nest of leaves and grass in which the young are born, in April or May. These are four or five in number, but may be more or less.

The Mole leads an active strenuous life, with short intervals for repose, and being usually hungry eats enormous quantities of food. One I kept in confinement for a short time consumed large numbers of worms, and was so keen and ravenous that it would allow me to stroke its fur while feeding. After a meal it would rest for a time, apparently asleep. It seemed very sensitive to any sudden noise, and visibly started if I made a slight squeaking note with the lips.

During a hot and dry spell of weather in summer Moles may often be seen above ground.

FAMILY **SORICIDÆ**.

GENUS **Sorex**.

THE COMMON SHREW.

Sorex araneus, Linnæus.

PLATE 9.

The insectivorous habits, long pointed snout, diminutive eyes, and short velvety fur, show that the Shrews are allied to the Mole and not to the mice, to which they have some superficial resemblance.

Our Common Shrew measures in length of head and body just under 3 inches. The tail (about $1\frac{1}{2}$ inches) is proportionately much shorter than that of the Lesser Shrew. The teeth, unlike those of the White-toothed Shrew of France and Germany, are of a reddish brown colour towards their points. The animal has a strong musky odour.

The colour of the fur on the upper parts varies a good deal in intensity, from a pale brown or rusty brown in summer to a much darker tint in winter. The under parts are dull greyish or yellowish white.

The Common Shrew is widely distributed, ranging throughout a great part of Europe and in Norway, according to Collett, is found as high up as the snow line. It also inhabits the northern parts of Asia and America.

This species is common in suitable localities over the whole of England and Wales, as well as the mainland of Scotland, though unknown in the Shetlands, Orkneys and Outer Hebrides, and also in Ireland. In the three

BRITISH MAMMALS

last mentioned localities where it is absent, its place is taken by the Lesser Shrew.

Though the Common Shrew is often about during the winter months, it is in spring, summer, and autumn that it is most frequently seen as it dodges out and in among the grass and dead leaves on hedgerow banks or in gardens and meadows.

During the breeding season in spring, the males often engage in battle. A combat of this kind is described by Mr. Millais, who observed two which were contending so fiercely that they fell headlong down a bank while locked in a deadly embrace. The food consists chiefly of slugs, worms, and the larvæ of insects, of which it consumes large quantities.

What has long been a puzzle to naturalists is the cause of the strange mortality among Shrews, occurring chiefly in the autumn, when numbers are found lying dead by wayside paths. Various reasons have been suggested as the cause, but the mystery is still unsolved.

In olden days this species was for long the victim of superstition and prejudice, various evils and misfortunes having been attributed to it, such as the lameness of cattle as a result of the passing of a Shrew over their feet or legs.

The well known description by Gilbert White of how these evils were believed to be curable by means of a Shrew-Ash may be quoted here. "Now a shrew-ash is an ash whose twigs or branches, when gently applied to the limbs of cattle, will immediately relieve the pains which a beast suffers from the running of a shrew-mouse over the part affected: for it is supposed that a shrew-mouse is of so baneful and deleterious a nature, that wherever it creeps over a beast, be it horse, cow, or sheep, the suffering animal is afflicted with cruel anguish and threatened with the loss of the use of the limb. Against this accident, to which they were continually liable, our provident forefathers always



THE COMMON SHREW

kept a shrew-ash at hand, which when once medicated, would maintain its virtue for ever. A shrew-ash was made thus :—Into the body of the tree a deep hole was bored with an augur, and a poor devoted shrew-mouse was thrust in alive, and plugged in, no doubt with several quaint incantations long since forgotten.”

According to Bell, from five to seven young ones are born at a time about the middle of April. These are reared in a nest of grass or dead leaves in a hollow of the ground protected by herbage or similar cover. On the other hand I have seen a nest, consisting of dead oak leaves and containing young as late as November 19th. This was found in a collection of old faggots in my garden.

THE LESSER OR PIGMY SHREW.

Sorex minutus, Linnæus.

PLATE 9.

To the Rev. L. Jenyns is due the credit of having first pointed out that the Lesser Shrew differed from the larger species, describing it under the name of *Sorex rusticus*.

This tiny creature, the least of our British Mammals, measures barely 2 inches from snout to root of tail, the length of the tail, without the terminal hairs being about $1\frac{1}{2}$ inches. Apart from the smaller and more delicately formed body and feet and more elongated snout, the long thickly haired tail is a sure means of distinguishing this species from the Common Shrew.

The colour of the upper parts is a pale brown, paler I think than in the larger species, and in the living specimen which served as a model

BRITISH MAMMALS

for the figure in the plate, the soft velvety fur of the body had a beautiful silvery gloss. The underparts are dull white.

The Lesser Shrew ranges from the British Islands through the greater part of Europe and over northern Asia, where it has been found within the Arctic circle (Dobson). Eastwards it reaches the Pacific, while closely allied forms represent it in America.

In the British Islands it is probably much more plentiful than would appear from the casual notices of its appearance, as its presence in any locality may easily pass unnoticed.

In the neighbourhood of Hascombe, Surrey, I have come across it as often, perhaps more often, than the Common Shrew, but in general it seems to be more sparsely distributed in England than the other.

The Lesser Shrew is common in many parts of Scotland and has even been recorded from the top of Ben Nevis, where a cat at the observatory brought home a specimen.

It is known on many of the Western Islands, being plentiful in the Outer Hebrides and has been recorded in the Orkneys, but not in the Shetlands. This shrew is abundant in Ireland where it is the only species.

In habits it resembles the Common Shrew, inhabiting hedgerow banks and meadows. It is apparently active in the winter, as I have more than once caught it in traps set to catch mice in an apple loft under the roof of my house.

Though hardy as regards severe cold under natural conditions the constitution of this little animal is yet extremely frail and sensitive to any kind of shock or untoward circumstances, even a few minutes detention in a trap being fatal, according to information supplied to Barrett Hamilton by Mr. A. H. Cocks (*A History of British Mammals*, part ix. p. 121.)

THE LESSER OR PIGMY SHREW

Its hold on life is so slight that it soon dies in confinement, even when caught by hand and uninjured.

One brought to me by a man working in my garden at first appeared quite lively and readily took the flies I provided while making the sketches for the figure in the Plate, but soon a gradual change began and it was dead in a few hours.

When feeding the long flexible snout was bent in almost any direction, while the fore feet were not used to hold the flies when eating, entirely different from the action of a mouse in similar circumstances.

At times the Lesser Shrew seems quite indifferent to the presence of human beings. I once observed one among some grass on a lawn which allowed me to approach so closely and seemed so tame that I caught some flies which it at once devoured, and becoming still more familiar it moved on to the palm of my hand and allowed me to lift it from the ground.

This is the only instance I have met with of such unusual tameness in a wild animal, but Mr. Millais mentions a somewhat similar case when a Water Vole allowed itself to be stroked (*Mammals of Great Britain and Ireland*, appendix). The nest and number of young are much the same as those of the Common Shrew.

BRITISH MAMMALS

GENUS *Neomys*.

THE WATER SHREW.

Neomys fodiens, Pallas.

PLATE 9.

This beautiful species is the largest of our Shrews, measuring in length of head and body from about 3 to $3\frac{1}{2}$ inches, with a tail measurement of about 2 inches.

The colour of the upper parts is usually a deep black with a slaty gloss, while the under parts are normally white, though sometimes darker, with a rusty tinge. The orifice of the ear is "feathered" with white hairs, and also the under surface of the tail. A darker form of this species often occurs with the whole body above and below more or less dusky, which was at one time considered distinct, and described and figured by Bell as the Oared Shrew (*Sorex remifer*).

Like the other British species, the Water Shrew has its teeth tipped with rust colour.

The form of this animal is well adapted to its aquatic habits, the toes as well as the tail being fringed with hairs which are of use when swimming and diving. Compared with its allies the snout of the Water Shrew is thicker and more powerful.

The Water Shrew has a wide range in Europe, from as far north as Russia to Spain and Italy, while eastwards in Asia it reaches the Altai Mountains. In Great Britain it is well distributed over England, Wales, and the mainland of Scotland, but unknown in Ireland.

THE WATER SHREW

As its name implies, the Water Shrew favours the neighbourhood of streams, where it is usually found about the margins of the quieter and more sluggish waters, or seen swimming in their clear pools. It is not however afraid of rapid waters, for I have seen it in quite a swift running stream in Norway, as it swam with its body silvered with air bubbles just under the surface.

The following account of its habits has been given by J. F. M. Dovaston in Loudon's *Mag.*, *Nat. Hist.* ii. 219: "It dived and swam with great agility and freedom, repeatedly gliding from the bank under water, and disappearing under the mass of leaves at the bottom, doubtless in search of its insect food. It very shortly returned and entered the bank, occasionally putting its long sharp nose out of the water, and paddling close to the edge. This it repeated at frequent intervals from place to place, seldom going more than two yards from the side, and always returning in about half a minute. Sometimes it would run a little on the surface, and sometimes timidly and hastily come ashore, but with the greatest caution, and instantly plunge in again."

The prey of the Water Shrew is very various, consisting of aquatic insects and their larvæ, worms, molluscs, frogs and small fishes, while sometimes the flesh of dead mammals is eaten.

The young, which are said to vary in number from five to eight, are provided with a nest of moss and herbage, placed under the surface of the ground.

Order CARNIVORA—FLESH-EATING MAMMALS

FAMILY **FELIDÆ.**

GENUS **Felis.**

THE WILD CAT.

Felis catus, Linnæus.

PLATE 10.

Fierce and bloodthirsty in disposition and possessed of great strength and activity, this typical beast of prey is perfectly adapted by nature for a life of rapine.

The male, as a rule larger than the female, measures in length of head and body about 2 feet, with the addition of another 12 or 14 inches as the length of the tail. Millais mentions an exceptionally fine specimen killed at Kinloch Moidart, Ross-shire, in October 1899, which measured 3 feet 10 inches from the nose to the tip of tail.

Compared with the domestic cat, which it often resembles in colour and markings, the true Wild Cat is much more muscular and robust, and possesses a bushy unpointed tail.

The ground colour of the long thick fur of the Wild Cat is in general a tawny or russet grey, beautifully banded and marked with black, the tail barred with the same colour, and the soles of the feet also black. Parts of the chest and belly usually white. The markings on the female are said to be less distinct.



THE WILD CAT

This species inhabits wild wooded districts in most of the European countries.

In England it has long been extinct, and the same may be said of Wales, but in the more remote deer-forests of the Highlands of Scotland it still exists, chiefly in Argyllshire, the north-western parts of Inverness-shire, Ross-shire, and the Reay Forest, Sutherland.

The Wild Cat still holds its own or did quite recently in the wilds of Knoydart on the west coast, where it has a typical fastness in the forest sanctuary, a rough rocky hill clothed with birches and old rowans, whence in the winter months it sallies forth to prey on rabbits or game in the home plantations. The true Wild Cat has never inhabited Ireland.

Mr. Millais, in his *Mammals of Great Britain and Ireland* (vol. i. p. 176) has graphically described its methods of attack as follows: "Emerging at dawn and before sunset, this stealthy animal creeps in and out of the forest growth and rocks looking for its prey. When the victim is discovered it is carefully stalked by sight alone until closely approached, when the Cat rushes in with a series of immense forward bounds. So swift is this final attack that four-footed game finds it impossible to escape, even if its terror-paralysed nerves did not benumb its muscles."

Charles St. John, who was well acquainted with this animal, says (*Wild Sports and Natural History of the Highlands*, 8th ed. pp. 44-45): "Inhabiting the most lonely and inaccessible ranges of rock and mountain, the wild cat is seldom seen during the daytime; at night (like its domestic relative) he prowls far and wide, walking with the same deliberate step, making the same regular and even track, and hunting its game in the same tiger-like manner; and yet the difference in the two animals is perfectly clear. . . . In the hanging birchwoods that

BRITISH MAMMALS

border some of the Highland streams and lochs, the wild cat is still not uncommon, and I have heard their wild and unearthly cry echo far in the quiet night as they answer and call to each other."

According to Millais two to five young are born at a time, usually in May.



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THE FOX

GENUS *Vulpes*.

THE FOX.

Canis vulpes, Linnaeus.

PLATE 11.

The Fox varies considerably in size, from the Lowland race measuring in length of head and body about 2 feet 3 inches with a tail of about 1 foot, to the much larger animal inhabiting the hills of Scotland, which may measure in total length from nose to tip of tail as much as 5 feet or more, and is also greyer in colour. This is in general a combination of reddish tawny-grey and rust colour on the upper parts, and white, or sometimes dusky-grey below. Upper surface of the ears black towards the tips, with longish white hairs inside the orifice. The feet black above, brown underneath. The white tip to the tail or brush is said to be more conspicuous in the dog Fox than in the Vixen, but individuals of both sexes are occasionally without it. The strong unpleasant odour of the Fox is caused by a fetid secretion in the sub-caudal gland, this "foxy" effluvium being intensified when the animal is excited.

Foxes, the same or only slightly differing in colour from our British race, are found throughout Europe, while other species inhabit Asia, Africa, and North America, those in the latter country being very closely related to our Common Fox.

The latter is plentiful all over the mainland of Great Britain and Ireland. It is by far the most intelligent and cunning of all our beasts

BRITISH MAMMALS

of chase, and endless tales have been told of the wiles and subterfuges employed to escape its enemies or circumvent its prey, from the days of Æsop to our own times. Except in the breeding season the Fox is unsocial and lives apart from his kind, usually occupying an earth or burrow made by some other animal, those dug by the Badger being often taken possession of, or even shared with the owner.

Foxes pair in the winter months, when the weird harsh cry of the vixen may often be heard at night as she calls to her mate, while the latter reveals his presence by two or three sharp little barks. The cubs, up to seven in number, are born about the end of March, and when old enough will come out to play and scamper around the entrance of their home, when their antics are most entertaining to watch. The sketch forming the tail-piece shows them thus employed, and was taken from life near Godalming.

As is often the case, I was told that the vixen never interfered with some fowls living close at hand, but would always forage for food at a distance. She was no doubt wise enough to know that her young might be endangered if depredations occurred near home.

Various are the ruses employed by the Fox when hunting his prey. Charles St. John, in *Natural History and Sport in the Highlands* (8th ed. pp. 195-196), describes how at daybreak he once watched one planning an attack on some hares feeding in the open, first preparing an ambush by scraping a hollow in the ground where he knew by instinct his quarry would pass when leaving the field after sunrise. As soon as a hare came sufficiently near his post, Reynard by a sudden rush seized and killed her immediately.

At times the Fox employs entirely different tactics, and will apparently make use of the curiosity or liability to fascination in the nature of any bird or other animal he may wish to circumvent.

THE FOX

As an instance of this, while walking some years ago along a Hampshire lane in June, my attention was attracted by the unusual crowing of a cock Pheasant among some tall grass in a meadow on the other side of the hedge. On making my way through a gap I saw a Fox some thirty yards away from the bird, circling around his prey yet without appearing to notice it. The Pheasant, although quite aware of his enemy's presence, was making no attempt to escape, and I think the Fox was trying to approach near enough for a sudden spring, when they both saw me and each made off.



Sub-Order PINNIPEDIA—WALRUS AND SEALS.

FAMILY TRICHECHIDÆ.

GENUS *Trichechus*.

THE WALRUS.

Trichechus rosmarus (Linnæus).

PLATE 12.

The Walrus or Morse—the first-mentioned name being derived from the Scandinavian Hvalros (“Whale-horse”), the latter from the Russian Morss (“Sea-horse”), inhabits the Polar seas and has only rarely been seen or captured in British waters.

The adult Walrus usually measures about 10 or 11 feet in length, but old males often exceed this and will even reach 15 feet in length.

This animal is remarkable for the great bulk and weight of its body and corresponding strength, and will weigh up to 3000 lbs. (Millais).

The long curved tusks, possessed by both sexes, are used as weapons of defence, and are also necessary to the animal when grubbing up molluscs among rocks and shingle while feeding under water. They are also said by some authors to be a help in climbing ice or rocks. The muzzle is furnished with a thick moustache of bristles, the skin on the face is wrinkled with seams and furrows and on the shoulders forms massive folds.

The colour of the Walrus is in general a pale yellowish brown, becoming deeper and redder on the underparts, but the hair on the older animals often wears away or disappears, leaving bare the leathery surface of the skin.

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THE WALRUS

This animal inhabits the northern circumpolar seas of both the Old and New Worlds, but is now much more restricted in its range than formerly. In North America it is still occasionally found as far south as the coast of Labrador, where once it was numerous, while in Europe it reaches the coast of Finmark.

Large herds used to frequent the seas around Spitzbergen, which are now deserted or where they only appear in small numbers. Though mentioned long ago as a visitor to the Scottish coast, the first reliable record was of one killed in the Outer Hebrides at Caolas Stocknis, Harris, in December 1817. This specimen, measuring some ten feet in length, was seen and described by MacGillivray.

According to Dr. Edmonston one was killed in the Shetlands in 1815, and another was obtained on Edday, Orkneys, in June 1825, while the last appears to have been killed by Capt. MacDonald, R.N., on the East Haskeir, near Harris, in April 1841. There is also good evidence showing that others have been seen at various times in British waters.

The Walrus makes his home among the ice-floes surrounding the frozen lands of the far north, where they herd in large colonies and pass their time, when not in the water, in sleeping or sunning themselves on the ice.

Dr. Kane, in his *Arctic Exploration* (pp. 243-246), thus describes the animal and its habits: "The specimens in the museums of collectors are imperfect, on account of the drying of the skin of the face against the skull. The head of the Walrus has not the characteristic oval of the seal; on the contrary, the frontal bone is so covered as to present a steep descent to the eyes and a square, blocked-out aspect to the upper face. The muzzle is less protruding than the seal's, and the cheeks and lips are completely masked by the heavy quill-like bristles.

"Add to this the tusks as a garniture to the lower face, and you have for the Walrus a grim ferocious aspect peculiarly his own. I

BRITISH MAMMALS

have seen him with tusks nearly 30 inches long ; his body not less than 18 feet. When of this size he certainly reminds you of the elephant more than any other living creature. . . . The instinct of attack which characterises the Walrus is interesting to the naturalist, as it is characteristic also of the land animals, the pachyderms, with which he is classed. When wounded he rises high out of the water, plunges heavily against the ice, and strives to raise himself with his fore-flippers upon its surface. As it breaks under his weight, his countenance assumes a still more vindictive expression, his bark changes to a roar, and the foam pours out of his jaws till it froths his beard. Even when not excited he manages his tusks bravely. They are so strong that he uses them to grapple the rocks with, and climbs steepes of ice and land which would be inaccessible to him without their aid. He ascends in this way rocky islands that are sixty and a hundred feet above the level of the sea ; and I have myself seen him in these elevated positions basking with his young in the cool sunshine of August and September."

The same author describes their voice as "something between the mooing of a cow and the deepest baying of a mastiff, very round and full, with its bark or detached notes repeated rather quickly seven or nine times in succession."

Around the breathing holes, which are made among much thicker ice than those of the seals, he observed numbers of broken clam-shells, and, in one instance some gravel, mingled with about half a peck of the coarse shingle of the beach.

The natural increase of this species is slow, as only a single young one is born at a time, which according to Bell is suckled by the mother for nearly two years, so that a period of three or four seasons ensues between birth of the calves. By the time they are weaned their tusks have grown several inches in length, enabling them to forage for themselves.

FAMILY PHOCIDÆ.

GENUS *Halichærus*

THE GREY SEAL.

Halichærus grypus, Fabricius.

PLATE 13.

Until quite recent years little was known of the habits and pelage of this fine species, which was often confused with the large Bearded Seal of the Arctic seas, *Erignathus barbatus*, and we owe much to Mr. Millais for the full and accurate account of its life history, which, after years of observation around our coasts, he has given in his *Mammals of Great Britain and Ireland*, vol. i. pp. 252-298. According to this authority "four distinct types are found, as well as every intermediate form between them, that is to say, specimens may occur which are composite of two, three or even four types." These types are described as follows: 1. The *Black Male*; 2. The *Light Grey Male*; 3. The *Blotched Male*; 4. The *Grey Spotted Male*.

The first and last mentioned are shown on the upper and lower part of Plate 13, with one of the intermediate forms between the two.

Around the throats of the adult males, and best seen in autumn when their coats are in good order, are several ridges of dark hair, forming bands which look like tarry ropes.

The colour of the female runs into two types, either light grey above and white below with some dark spots on the throat, shoulders and

BRITISH MAMMALS

fore-flippers, or a dark form, chiefly composed of shades of grey, blotched and spotted with black.

A characteristic feature in nearly every example of the Grey Seal, as Mr. Millais points out, is the pale grey colour of the crown of the head, which occurs in every type.

When born the young are at first pure white, and pass through various stages of colour till they gradually assume the adult coat.

The average length of the Grey Seal is about 8 feet, but some reach 9 or 9½ feet, measured from nose to end of tail.

The female measures 6 feet or thereabouts in length. The head is flatter, proportionately much longer and more like that of a dog than in the Common Seal, while the animal is not nearly as tameable and intelligent as the latter; the countenance, especially in the old males, suggesting a savage and morose disposition. On the other hand, Dr. Edmonston found a young one of this species extremely gentle and affectionate.

The Grey Seal inhabits the North Atlantic, but is only sparsely distributed on the American coasts and apparently does not go farther south than Nova Scotia.

It is more abundant along the northern coasts of Europe, yet does not appear to penetrate far northwards, chiefly frequenting the shores of the North Sea, Baltic, and Gulf of Bothnia.

It is found in Iceland, the Faroes, Scandinavia and Northern Germany and along the coasts of the British Islands.

In England it is rather rare, but a fair-sized colony inhabits the Scilly Islands, a few still exist in the Farnes, Northumberland, and from time to time it appears on other parts of our shores, as in Wales, where some are found on the coast of Pembrokeshire.

In Scotland it is much more common, especially on the north-western coast and islands, the Hebrides, Orkneys, and Shetlands.

THE GREY SEAL

This species is also plentiful in Ireland, where it haunts the sea-caves on many parts of the coast, chiefly along the western side.

The Grey Seal is most at home among the rough and troubled waters of our outlying islands where the sea is seldom still. There he can bask undisturbed on the shelving rocks or retire into the fastness of some cavern under water.

The tailpiece sketch represents a typical haunt of this Seal, and was done from sketches taken a few years ago on Rosvean, Scilly, by means of a field-glass, through the kindness of the late Mr. Dorrien-Smith. This Seal-haunted rock lies far out to sea, fully exposed to the Atlantic rollers and is difficult to approach except in calm weather. On peeping over the high boulder-like rocks near the favourite landing-place of the animals I had three or four in full view, lying basking in the sunshine, but always watchful and ready to slip under water at the least suspicion of danger. When ashore taking their ease they appreciate a slight hollow in the rock and will often turn over and change their position to ensure more comfort. On the island of Handa, Sutherland, I have watched for an hour or more a party of these large Seals resting on an isolated rock below the cliffs where the Fulmar Petrels and Guillemots breed. This was in the month of May when small parties will bask peacefully in company, but in the breeding season, later on in October, the big males fight fiercely and are generally much scarred as a result of these combats. Sometimes a male will occupy a sea-cave with a single female, but they are just as often polygamous. When born, the young are left on shore by the mother, who returns regularly to suckle them for the first few weeks till they take to the water.

Few animals are more difficult to obtain than the Grey Seal, owing to the stormy seas with treacherous currents where he makes his home.

BRITISH MAMMALS

Unless successfully stalked and killed instantaneously while taking his siesta near the water's edge, he is seldom secured. As a rule it is useless to shoot them while on the surface of the sea, as they sink almost immediately, and when this happens in deep water they are lost.

A successful method of capturing this seal, which now seems to be seldom practised, was to fix a strong net under water at the entrance of the caverns frequented by the animals, when they were often caught in the toils as they tried to escape seawards.





SUB-FAMILY PHOCINÆ.

GENUS *Phoca*.

THE COMMON SEAL.

Phoca vitulina, Linnæus.

PLATE 14.

Considerably smaller than the preceding species, the adult male of the Common Seal measures from nose to end of tail from 4 to 5½ feet, or sometimes more, especially specimens from the Orkneys and Shetlands.

As shown by Mr. Millais (*Mammals of Great Britain and Ireland*) there is a good deal of variation in the colour of this animal, which apart from the seasonal changes of pelage, shows two distinct types, one light and the other dark, according to the closeness to each other of the dark spots and markings on the lighter ground-colour of the coat.

Between these two types intermediate forms occur. The chief figure in Plate 14 gives the lighter form in winter coat, which in August changes to a more or less plain sandy colour with only some faint markings remaining. The other and darker figures are from a younger example in the gardens of the Zoological Society of Scotland in summer.

The Common Seal is found on the coasts of the North Atlantic as well as those of the North Pacific, ranging northwards along the shores of Greenland as far as or beyond Davis Straits. It is said to frequent Spitzbergen, and also visits Iceland and the Faroes, while it is common on the coasts of northern Europe, and occasionally comes as far south as the Mediterranean.

BRITISH MAMMALS

In England this Seal is thinly distributed on the western side and scarcely known among the Scilly Islands, where the Grey Seal is not uncommon. On the east coast, some haunt the neighbourhood of the Farnes, and visit the shores of Durham, Yorkshire, and Lincolnshire, but are rare south of the Wash. In days gone by they were numerous about the sand-banks at the mouth of the Tees.

Where salmon rivers enter the sea on the east coast of Scotland the Common Seal may be seen in large numbers during the summer months, but the chief haunts of this animal in the north are the Hebrides, Orkneys, and Shetlands, where it is abundant. According to Mr. Millais, in the work already quoted (vol. i. p. 310), "the majority of those frequenting the east coast of Scotland are migratory, while those on the west are, except for local movements, stationary."

Early in June the female gives birth to a single young one, which, unlike the pup of the Grey Seal, takes to the water almost immediately. In the opinion of Mr. Millais the first white woolly coat of the baby Common Seal must be shed before birth, as there is no evidence of any ever having been observed in the water except in their second pelage.

The Common Seal, owing to the constant persecution it receives, becomes extremely wary as it gains experience, and the old male before lying up on shore for a siesta will always first carefully survey his surroundings.

One curious side of his character has been referred to by Mr. Millais, who says (vol. i. p. 317): "The look-out is often the Seal that has most recently emerged from the ocean and is still wet. From this we may deduce a certain subtle reasoning and recognition of its own limitations on the part of the animal, for only during the short time after coming from the sea is the Seal keenly alive to the possibilities of impending danger. As his coat dries he becomes too sleepy to trouble

THE COMMON SEAL

about extraneous matters, so his place must be taken by another that is more awake and fresher from the sea.”

Graceful and swift in his natural element the Seal is awkward when ashore, though capable of jerking his body forward at some speed if alarmed and making for the water. Seals are naturally inquisitive and attracted by any unusual sound, and are even credited with a love of music.

THE RINGED SEAL.

Phoca hispida, Schreber.

PLATE 15.

This small Arctic Seal, the “Floe-rat” of the Seal hunters, usually measures about $4\frac{1}{2}$ feet from nose to tip of tail.

The colour of the adult is dusky grey or brown above, curiously marked with rings and irregular figures of yellowish white, the centres of which are dark, the space round the eyes is dusky, the under parts buffish white.

The Ringed Seal penetrates far north among the ice of the circumpolar regions and has been obtained up to or beyond lat. 82°. It is common on the coasts of Greenland, Spitzbergen, Nova Zembla, North Iceland, and Northern Europe, while occasional stragglers reach the British coasts.

The first recorded specimen occurred on the Norfolk coast in 1846; this was purchased in the fish market of Norwich by Mr. J. H. Gurney and later identified by Professor Flower. Mr. Millais mentions two other examples, one killed at Collieston, Aberdeenshire, in August 1897, and a second taken in the salmon nets in Aberdeen Bay during the summer of 1901.

BRITISH MAMMALS

The Ringed Seal—the *netsik* of the Esquimaux hunters—forms the chief food supply of these people, as it does not leave the ice in winter. Dr. Kane (*Arctic Explorations*, pp. 153-154) says “the seal are shot lying by their *atluk* or breathing holes. As the season draws near midsummer they are more approachable: their eyes being so congested by the glare of the sun that they are sometimes nearly blind. . . . Each seal yields a liberal supply of oil, the average thus far being five gallons each. . . . The *netsik* will not perforate ice more than one season’s growth, and are looked for therefore where there was open water the previous year.”

They pass much of their time on the ice near their breathing holes, ready to slip under water on the least alarm.

The old males have a strong offensive odour, which is said to be imparted to the Esquimaux when they eat these animals.

THE HARP OR GREENLAND SEAL.

Phoca grønlandica, Fabricius.

PLATE 15.

This strikingly marked species, of which an adult male is shown in the Plate, measures from 5 to 6 feet in length.

The predominant colour is a yellowish white, with two irregular bands of deep purplish brown or black along the flanks, which meet on the shoulders.

The muzzle, face, and sides of the head are also of the same dark colour.

The females are less distinctly marked, and are often grey on the upper parts, with some dark spots.



THE HARP OR GREENLAND SEAL

The young, at first white, gradually acquire the adult pelage, which, according to Mr. Millais, is not attained till the fifth year.

The Harp Seal inhabits the North Pacific and North Atlantic, and in spring is very abundant on the ice-fields north-east of Newfoundland, where they breed in large herds and afterwards move north to spend the summer in Greenland.

They are also found about the west coast of Greenland in autumn, and in summer are common among the floating ice around Spitzbergen and Jan Mayen.

This Seal sometimes visits the British coasts in summer, the first having been identified in 1836, when two were obtained in the Severn. Several more have been recorded from time to time, including a fine adult male, now in the Perth Museum, which was shot by Mr. Kennedy while out punt-shooting in Invergowrie Bay, Carse o' Gowrie, Perthshire.

A good many other examples of the Harp Seal have been seen about the Scottish coasts and islands, while it is unlikely that any mistake could be made in identifying the species, because the clearly defined markings of the adult male may readily be recognised at a distance.

In habits the Harp Seal is migratory and gregarious. Incredible numbers collect at certain seasons among the ice floes and are killed in thousands by professional seal hunters. The young are born on the ice in March, and when strong enough follow their parents in their migratory movements. In spite of the havoc caused by the sealers the Harp Seal is apparently as numerous as ever, according to information supplied to Mr. Millais in Newfoundland. The food consists chiefly of cod and other fish.

BRITISH MAMMALS

GENUS **Erignathus**, Gill.

THE BEARDED SEAL.

Erignathus barbatus, Fabricius.

PLATE 16.

The Bearded Seal is another Arctic species which attains a large size, the adult males sometimes measuring 12 feet in length.

Dr. Kane (*Arctic Exploration*, p. 154) says, "I have measured these ten feet in length, and eight in circumference, of such unwieldy bulk as not unfrequently to be mistaken for the walrus." Adult specimens of this seal are rarely to be seen in British collections, the only one I have been able to find being in the Royal Scottish Museum, Edinburgh.

The coat of this example which I have figured in the Plate is of a yellowish drab-colour without spots or markings, while the flattened bristles on the muzzle, which have given the animal its name, are dull white. The head is small and round, the fore-flippers furnished with strong curved claws.

It inhabits the northern Polar Seas of both the Old and New Worlds, going far north and being well distributed from the coasts of Labrador and Greenland to Spitzbergen and the northern parts of Scandinavia. This species also frequents the North Pacific.

The Bearded Seal has only once been known with certainty to have reached the British Islands, when a young male was taken off the Norfolk coast in February 1892.

From Dr. Kane we learn that this species, unlike the Ringed Seal, makes no *atluk* or breathing hole in the ice, but depends on accidental fissures where bergs or floes have been in motion. The skin is much prized by the Esquimaux for making harpoon lines for Walrus hunting.



SUB-FAMILY CYSTOPHORINÆ.

GENUS *Cystophora*.

THE HOODED SEAL

Cystophora cristata, Erxleben.

PLATE 16.

The Hooded Seal, also known as the Crested Seal and Bladder-nose, measures about 8 feet in length. The drawing of this species, shown in the lower part of the Plate, was taken from a specimen in the Royal Scottish Museum.

The ground colour of the body in this example is a dark grey, blotched and marbled with black, the face and muzzle are also black.

Immature examples are silvery grey above and yellowish white below. The strange inflation on the upper parts of the face in the adult males forms a kind of bag or sac which can be filled with air when the animal is angry or excited, or relaxed when at rest.

This migrating Seal inhabits the Arctic Ocean from Greenland to Northern Europe, ranges as far north as Baffin's Bay, and also frequents the American coast.

In England the first example was taken on the River Orwell, Suffolk, in June 1847, while another was captured alive at Frodsham, Cheshire, in February 1873.

The records for Scotland are: one stoned to death by some boys on a rock near St. Andrews in July 1872, one shot in Ollerswith Bay, Sanday, Orkneys, December 1890, another obtained on Benbecula in

BRITISH MAMMALS

May 1891, and the last shot at the mouth of the Lossie near Elgin, in February 1903. All these seals appear to have been young animals.

Mr. Millais (*Mammals of Great Britain and Ireland*, vol. i. p. 364), describes this species as loving the drift ice and rarely visiting rocky shores, he says: "The Hooded Seals accompany the great body of the Harp Seals that come through the Straits of Belle Isle every winter, and after fishing about the Newfoundland banks, haul up on the floe ice to the east of that island, where they bring forth their young about a week later than the Harps."

The Hooded Seal is said to be more courageous than the other species, and will defend itself or young when attacked by sealers on the ice.





Order CARNIVORA (*continued*)

FAMILY MUSTELIDÆ.

SUB-FAMILY Lutrinae.

GENUS *Lutra*.

THE COMMON OTTER.

Lutra vulgaris, Erxleben.

PLATE 17.

The form of the Otter is well adapted to its aquatic habits, the long flattened body, tapering tail, short legs, and broad webbed feet, enable the animal to glide silently and swiftly under water when pursuing its elusive prey. The muzzle, well provided with stiff whiskers, is broad and overlaps the lower lips. The colour of the outer hair on the upper parts is in general a rich glossy brown, while under this is a coat of soft greyish fur. The cheeks, chest, belly, and inner surface of the limbs are a dull grey. Considerable variation occurs in the size and weight of the Otter, but a full-grown male will measure from nose to end of tail from about $3\frac{1}{2}$ to 4 feet, the tail being rather more than half the length of head and body.

The Common Otter inhabits the greater part of Europe, and also Asia and America, the smaller race of Northern India and the larger one of North America not being recognised as distinct.

In the British Islands, it is widely distributed throughout England, Wales, Scotland and Ireland. Owing to its shy and retiring habits

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it is seldom seen except when hunted, and will often frequent a stream without its presence being detected.

The Otter usually lies up during the day in his holt or retreat, which may be under a bank, in a hollow pollard tree by the stream, or merely a dry bed among reeds or bushes, whence he issues towards nightfall to prey on various kinds of fish or on frogs. Eels form a large and favourite part of the Otter's diet, as well as salmon and grilse, while on the sea-coast numbers of flounders are caught in the shallow pools at the mouths of rivers. Occasionally small mammals and birds are eaten.

I have only once seen an Otter abroad during the day, when one passed close to me as he made his way along the banks of a rocky burn in Sutherland.

When an Otter enters the water no sound or splash will be noticed, as the animal has a wonderful power of silently gliding under the surface, leaving nothing more than a ripple and a chain of air bubbles to mark the spot where he vanished. Even the speed of the salmon is not sufficient to save it, for the Otter will persistently hunt a fish in the pools of a river until the latter is exhausted, when it is easily captured and brought ashore to be eaten. The prey is often left on the bank with nothing more than a bite taken out of the shoulder, and in former days, when Otters and salmon were plentiful in Scotland, people used regularly to visit the likely spots on the banks of rivers to obtain what the Otter had discarded.

Charles St. John, who knew its habits intimately, says (*Wild Sports and Natural History of the Highlands*, 8th ed. p. 115): "They appear to go a considerable distance, generally hunting down the stream, and returning up to their place of concealment before dawn. At certain places they seem to come to land every night, or, at any rate, every time they pass that way. In solitary and undisturbed situations I have

THE COMMON OTTER

sometimes fallen in with the Otter during the day. In a loch far in the hills I have seen one raise itself half out of the water, take a steady look at me, and then sink gradually and quietly below the surface, appearing again at some distance, but next time showing only part of its head. At other times I have seen one floating down a stream with no exertion of its own which could attract notice; but passing with the current, showing only the top of its head and its nose, with its tail floating near the surface, and waving to and fro as if independent of all restraint from its owner."

Two or three young are usually born at a time in some well-concealed shelter, such as a covered drain, a hole in a bank, or inside a hollow tree by the water. The cubs are taught to swim and catch their prey by the mother.



SUB-FAMILY **MELINÆ.**

GENUS **Meles.**

THE BADGER.

Meles taxus, Boddaert.

PLATE 18.

Our Common Badger, whose fossil remains found in ancient deposits show that his ancestors were coeval with the mammoth, appears to have some kinship with the Bear, and like that animal is plantigrade, placing the soles of the feet on the ground when moving.

The length of a full-grown Badger is about 28 to 30 inches from nose to root of tail, the latter measuring another 7 or 8 inches. The colour of the coat is chiefly a warm grizzly grey, the checks and forehead white, with a black band extending from near the nose to behind the ears, which are white at the tips. The throat, chest, under parts, legs, and feet are black. The thickset brawny body, powerful jaws, and long sharp claws of the Badger make him a formidable foe and a match for almost any dog large enough to enter his stronghold, and as none of our wild animals care to molest him, he leads on the whole a peaceful life.

Our Common Badger inhabits northern Europe and Asia, and also the greater part of the British Islands, though apparently not in such numbers as formerly. However, it may often exist in a district where its presence is not suspected, owing to its nocturnal habits and love of seclusion.

It is certainly a common animal in parts of Surrey, where its earths are numerous, and from these strongholds it nightly makes forays, leaving



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THE BADGER

unmistakable traces of its presence in the woods and copses, where the turf and soil have been routed by the snout of the animal while searching for grubs or roots during these evening rambles. In autumn I have often found the nests of wasps dug out and scattered, as the larvæ of the insects form a favourite food of the Badger, who finds no difficulty in digging out the combs with his claws, while his thick coat effectually protects him from the stings of the insects.

The Badger takes life easily and passes a good part of it asleep in his den, though he is active enough when out at night on his rambles. His stronghold is an elaborate system of burrows dug far into the soil, and as a rule in a sloping bank, in which are various turns and corners, serving as vantage ground, where the animal can best defend itself against an enemy. Often there are several entrance tunnels to the fortress.

The Badger is scrupulously clean and tidy in his habits, and makes a comfortable bed for himself of dead bracken and grasses which is periodically replenished or sometimes taken out to air and replaced. He seldom leaves his home in the daytime, but during the short summer nights may come out about sundown.

On the whole, the Badger is a harmless and useful animal, devouring worms, grubs, reptiles, and various grubs and roots, though also partial to young rabbits, eggs, or other dainties he may come across.

With his keen power of scent he is able to detect the exact spot where a family of young rabbits have been left in their underground nursery, when he will dig directly down on them.

Though less active in winter the Badger does not hibernate, and will come out when snow covers the ground. I have seen their tracks as they left the neighbourhood of their earths, crossing a field to a distant plantation, showing where they made their nightly excursions.

Three or four young are born at a time in spring.

SUB-FAMILY **MUSTELINÆ.**

GENUS **Mustela.**

THE PINE MARTEN.

Mustela martes, Linnæus.

PLATE 19.

Two species of Marten were at one time believed to inhabit the British Islands, namely the Beech Marten, *m. foina*, and the Pine Marten, *m. abietum*, as described by Bell in his *British Quadrupeds*, and it was not until 1879 that the late E. A. Alston was able to prove that we have only one, the Pine Marten.

This species differs from the white-breasted Beech Marten of the more southern parts of Continental Europe, in having a narrower skull, while the coat is darker and the breast usually orange or yellowish white. As the latter becomes paler and often white when the animal grows older, our Marten was frequently confused with the other, though not by observant naturalists like Charles St. John, who long ago stated his belief that we had only one.

In colour, the outer fur of the Pine Marten is a rich glossy brown, under fur warm grey, the legs and feet a deep brown. The length of head and body about 21 inches, the tail (including hairs) 12 inches.

This species has a wide range over northern Europe and Asia, and at one time was common in many parts of the British Islands, though now much restricted in distribution and numbers.

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THE PINE MARTEN

It still lingers in the north-western districts of England and also in Wales and Ireland, while it is by no means extinct yet in the Highland deer forests, which are its chief strongholds in Scotland.

Though by nature a forest loving species, the Pine Marten is not confined to the woods, but will often make its home among the rocky cairns and heather of the open hillside.

On such ground it preys on the mountain hare and rabbit and has been accused of killing sheep and lambs. His great agility and strength enable the Marten to surprise and overcome large birds like the blackcock, and in forest country squirrels, which are hunted down on the trees, are a favourite quarry. St. John noticed its fondness for fruit, especially raspberries, and also observed that it was more often seen abroad during the day than other members of the Weasel family.

The female Marten makes use of a cairn, or sometimes the deserted nest of a bird, in which to rear her young, which usually number from two or three to five. The fur of this animal, which is closely allied to the Sable, is prized on account of its beauty, and is quite free from the unpleasant odour of the Polecat's.

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THE POLECAT.

Mustela putorius, Linnæus.

PLATE 20.

The Polecat, Fitchet, or Foumart (foul marten), as it is variously called, is smaller and more robust in form than the Pine Marten and is much less active and alert in character.

The length of head and body of the male measures about 18 inches, the tail 7 or 8 inches.

The under fur, soft in texture and pale yellowish buff in colour, blending with the glossy brown or black of the long outer hairs, makes a beautiful combination of colour and gives to the animal a very handsome appearance.

It owes its name of Foumart to the highly offensive odour it can emit when irritated, which is stronger than in the Stoat or Weasel.

The Polecat is found over northern and central Europe, where it occurs even high up among the Alps, but does not penetrate far into the southern parts of the Continent. In England it is rare in the southern countries and appears to be nowhere common, but, according to Mr. Millais, *Mammals of Great Britain and Ireland*, it is not so rare in Wales as it is generally supposed to be.

In Scotland, where it was at one time abundant, the Polecat is now very scarce. Being very easily trapped, and preying chiefly on rabbits which it followed into their burrows, it soon became rare or extinct when steel traps became common. As it is also very destructive to game



THE POLECAT

and poultry it was persistently sought for by keepers and farmers, who have more or less exterminated the species.

In character the Polecat is bold and aggressive ; as an instance of this I remember as a boy one brought home by my brother, who came across the animal while eating a rat by the roadside near Dalhousie, Midlothian. On being disturbed it boldly left the shelter of the hedge and attacked, but was killed by a blow on the head with a stick.

Like the other *Mustelidæ* it is very destructive and bloodthirsty, and when breaking into a hen-roost will immediately kill all the fowls within its reach.

The female is especially destructive at the time she is rearing her young, when large supplies of food, consisting of mammals, birds, and fishes, have been found in her larder. Eels and frogs appear to be a favourite food of the animal.

THE STOAT.

Mustela erminea, Linnæus.

PLATES 21-22.

A distinctive feature in the Stoat or Ermine, by which it can at once be recognised at all seasons, is the glossy black extremity of the tail. In summer the outer fur of the upper parts is a russet brown, the soft under coat a pale warm grey, the lips, throat, and entire under parts, including the inside of the legs and usually the feet, are white, tinged with lemon yellow, as figured in Plate 21.

In winter in cold climates all the brown hairs on the head, body, and base of the tail generally lose their colour and become white, but show a yellow suffusion.

BRITISH MAMMALS

In Great Britain the Stoat when it whitens generally begins to change in November or December, those in the colder parts, such as northern Scotland, bleaching earlier than in England, where often the only alteration may be a slight fading of the russet coat and a small extension of the white.

According to Bell (*British Quadrupeds*, 2nd ed. pp. 198-199) "The first indications of alteration in colour are such as might readily escape observation. It is on the basal or brown part of the tail and on the toes that the white first makes its appearance; and after this the white of the belly extends upwards on the animal's sides, thus destroying the regularity of the line where the brown and white meet; about the same time the legs become powdered with white. A more advanced stage shows the limbs and root of the tail white, and the brown of the back reduced to a narrow stripe, excepting on the rump, which, with the head and hind neck, is the latest to change; and, in fact, these parts rarely become quite white in this country."

In Plate 22 is given a figure of the Stoat taken from the specimen obtained in Argyllshire in January 1919, which shows the full winter pelage, excepting a small mask of brown on the face, always the last part to change. As a sign that the alteration in colour is climatic and not dependent on the season, it is known that Stoats inhabiting the summit of Ben Nevis retain their white coats in summer. Some individuals seem more inclined to assume the winter dress than others, for even in the south of England I have seen one in a comparatively mild season with nearly half the body white.

The long sinuous neck and body and short legs of the Stoat are perfectly suited to its mode of life, and enable it to follow its prey such as rats into their narrow underground workings.

The average length of head and body in the male is about $10\frac{1}{2}$ inches, the tail about $5\frac{1}{2}$ or 6 inches.



THE STOAT

In character the Stoat is the embodiment of agility and strength, and will often run down and kill animals as large as a hare, while rabbits and smaller mammals, game-birds and fowls, are also preyed on. It seems strange that such swift-footed creatures as the hare and rabbit should be unable to escape the attack of the Stoat, who kills by biting through the arteries of the neck, yet when tracked by their enemy they soon lose their nerve and lying down are easily mastered. Their despairing cries at such times are pitiful to hear.

What is still more strange is the courage sometimes displayed by a doe rabbit when her young are molested, when she will boldly charge and put to flight the aggressor. Mr. Millais gives an instance of this, and I have myself witnessed a somewhat similar incident on the moors near Pitlochry, when I observed a rabbit persistently chasing a Stoat, which kept dodging among the heather in his efforts to escape.

The Stoat is naturally frolicsome, skipping about and playing for his own amusement, though he also makes use of these playful gambols to get within reach of some unsuspecting animal, whose sense of danger is lulled by his curious antics.

The Stoat is a bold and strong swimmer, and is known to be able to catch eels.

By watching his tracks in snow, sometimes in the open, or winding about hedgerows in and out of the rabbit holes, one can gain some notion of the Stoat's method of hunting and the long distances he will travel in pursuit of his quarry.

The young, usually about five or more in number, are born in a nest made in some cavity in a stone wall or bank, within a hollow tree, or sometimes in a deserted bird's nest.

In the background of Plate 21 is shown a figure of the Irish Stoat, the *Putorius hibernicus* of Mr. Oldfield Thomas and Major

BRITISH MAMMALS

Barrett-Hamilton ; a sub-species of the Common Stoat, the chief difference being a matter of colouring.

In the Irish race the white on the upper lip is absent, and the extent of this colour is also much narrower on the belly and chest, its continuity being sometimes broken on the latter.

The measurements are rather less, whilst the white dress is seldom assumed in winter.

This form also inhabits the Isle of Man.

I am indebted to Lieut. Talbot Clifton, R.N.V.R., for kindly sending me a specimen from Connemara for the illustration.





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THE WEASEL

THE WEASEL.

Mustela vulgaris, Erxleben.

PLATE 23.

Apart from its short and comparatively slender tail, of a uniform reddish brown in colour without any black at the tip, the Weasel may be readily distinguished from the Stoat by its smaller size, paler colour, and pure white under parts.

In length of head and body the male measures about 8 inches, with 2 inches more for the tail. The female is less, often so much so that it has been mistaken for a smaller species, and in the southern counties of England was known as the 'Cane' or 'Kine.'

The Weasel inhabits Europe, northern and central Asia, and North America.

Though common throughout the mainland of Great Britain it is unknown in Ireland, where the only species of the *Mustelidæ* are the Marten and Stoat, but the latter often passes under the name of 'Weasel' in Ireland.

On account of its fondness for mice, voles, and young rats, the Weasel deserves the benediction of all farmers and agriculturists, and well repays protection. It is not nearly so destructive to game as the Stoat or Polecat, though showing a decided partiality for young rabbits.

Mouse holes and the tunnels of moles are easily entered by this slim little hunter, and as he hunts by scent his prey seldom escapes.

When after a mouse or vole the Weasel follows along their runs without a check ; I have watched one chasing a vole, which was first

BRITISH MAMMALS

hunted out of a hedgebank, and killed as it tried to cross the open road by a single bite on the head.

As far as I have noticed, voles when hunted do not lie down and give in like a hare or rabbit, but do their best to escape till the end.

Weasels can climb well and will ascend a tree to some height. I once dislodged one from a Martin's nest under the eaves of my house, which was apparently used as a snug day-time retreat by the Weasel.

The hearing and scenting powers of this animal seem much better than its eyesight, and if the sound of a mouse in distress is imitated by a squeaking noise of the lips, a Weasel may be lured to within the distance of a yard or two. I have seen one come close up to me on a high road.

Instances have been known of birds of prey being killed in the air by the bites of Weasels on which they had pounced. Bell mentions an encounter of this sort, when a Kite had been the aggressor.

Like the Stoat, the Weasel will occasionally hunt in company, when small packs of half a dozen or so will work together like hounds. These parties probably consist of the mother and her grown-up family.

As an instance of the tiny space through which a Weasel can pass its slender body, I once found one in a mole-trap with its body behind the shoulders encircled by the small perforated piece of metal which acts as a trigger, the aperture being only about an inch in diameter.

The five or six young are born in a nest placed in a hole in a wall or old tree.

In the northern parts of its range in Europe and America the Weasel is said to become entirely white in winter, but this change of colour does not occur in Great Britain, where the white examples recorded from time to time appear to be albinos.



Order RODENTIA—RODENTS, OR GNAWING ANIMALS

FAMILY SCIURIDÆ.

GENUS *Sciurus*.

THE COMMON SQUIRREL.

Sciurus vulgaris, Linnæus.

PLATE 24.

Passing the greater part of its life among the branches of trees, the strong flexible feet and sharp claws of the Squirrel enable it to maintain a hold of the boughs with the greatest ease, whilst the long bushy tail, besides acting as a poise for the body, forms a warm wrap against the cold.

The length of the head and body is about $8\frac{3}{4}$ inches, the tail, including the hairs, about $8\frac{1}{2}$ inches.

When in full winter coat, which is assumed in October by a moult, the colour of the fur is in general a soft warm grey, as shown in the Plate, relieved by the chestnut tints on the limbs and white under parts, which do not change with the season. The tail, rather flat than cylindrical in form, is well haired, bushy, and glossy brown in colour with a pale buff tip.

In summer the coat moults again to a more or less reddish chestnut hue, and the hairs of the tail, which by this time are scanty, blanch to a light buff colour. Blyth appears to have been the first to observe that

BRITISH MAMMALS

the Squirrel sheds its coat twice in the year, and that in summer the ornamental ear-tufts are entirely wanting.

The Common Squirrel inhabits Europe from Lapland to northern Italy, and ranges throughout Siberia to Japan.

Those in the more northern parts of its habitat are very grey in colour and provide a valuable fur.

In England, Wales, and Scotland, the Squirrel is indigenous and common in most wooded districts, but in Ireland, where it is also now plentiful, it is said to have been introduced by human agency in quite recent times.

This nimble little climber is familiar to most of us in the country, as he passes from tree to tree among the topmost branches or swiftly runs up their stems in a nervous jerky manner when surprised upon the ground.

Mr. Millais, in his *Mammals of Great Britain and Ireland* (vol. ii. pp. 147-148), has most happily described its acrobat-like behaviour as follows: "Often after its first rush to safety it lies flat and motionless against the trunk with all legs extended and head pressed close to the bark. If you follow it round to get a better view, it either ascends by scrambling rushes to the higher branches, or, if it considers the tree too bare, darts off along the stems to another and yet another tree, until it finds refuge high up in some dense pine or Scotch fir, where it is lost to sight. In such a position it will remain for hours without moving. When running from one tree to another it keeps its tail depressed, and it uses this appendage with great skill to aid in maintaining its balance when running along the slender twigs."

The food of the Squirrel is varied, consisting chiefly of nuts and other seeds of trees, wild berries, the eggs and young of birds, and also the old birds when it can catch them.



THE COMMON SQUIRREL

One on a spruce fir in my garden was seen to take a flying leap at a small bird—a robin, I think—which, however, it failed to secure.

Gilbert White observed that the Squirrel when eating a nut, after rasping off the small end, splits the shell in two with his long fore-teeth, as a man does with his knife.

Stores of beech-mast and nuts are laid by in some hiding place for the winter, and during this time the Squirrel sleeps a good deal in his warm winter 'drey' or nest, but it seems doubtful whether the animal hibernates much at this season, in Britain at all events. One sees them abroad even in the coldest weather, and the scattered remains of fir cones on the snow under the trees show where they have been feeding.

Early in spring a nesting drey is prepared, in which from two to four young are born at a time.

FAMILY **MYOXIDÆ.**

GENUS **Muscardinus.**

THE COMMON DORMOUSE.

Muscardinus avellanarius, Linnæus.

PLATE 25 (*Frontispiece*).

Allied to the Squirrel, which it resembles in some of its habits, the Dormouse is of stouter build than the true mice and possesses a thicker and bushy tail.

The prevailing colour of this attractive little animal is a soft brownish buff, brighter on the face and flanks, blending into pale cream colour on the belly, and white on the throat and breast. The fur is very soft in texture, with a beautiful grey gloss or bloom on the upper parts of the body.

The length from nose to root of tail in a full-grown specimen is about 3 inches, the tail between $2\frac{1}{2}$ and 3 inches. The large prominent dark eye is a striking feature in this beautiful species.

The Dormouse is more restricted in his distribution than the Squirrel, inhabiting central Europe from northern Italy to Sweden and ranging eastwards to Galicia.

In the British Islands its range is confined to England and Wales, where it is unevenly distributed and does not appear to be known farther than the northern boundaries of Durham.

The Dormouse is fairly plentiful in the southern and western counties of England, though rare in the Midlands and Norfolk. A full account

THE COMMON DORMOUSE

of its distribution has been given by Mr. G. T. Rope in the *Zoologist*, June 1885.

I have found it abundant in the neighbourhood of Godalming in Surrey, where the numerous copses of hazel-nut, shady hedgerows and similar cover seem specially suited to its habits. Mr. Millais in his work on our Mammals has pointed out the "great similarity in the habitat of this animal and the nightingale. Both frequent forest edges but seem to shun the solitude of the forest itself."

Having fattened on the autumnal harvest of nuts, the Dormouse lays by a store for the winter and retires to its nest about the latter part of October, when curling itself into a ball, with the tail wrapping the head and body, it falls into a deep slumber which lasts with a few short intervals of partial activity till the following April.

The winter nest, composed of dead grasses, leaves, and moss, is variously placed, sometimes among roots or ivy-covered stumps of trees close to the ground, sometimes in thickets of brambles, where the one shown in the Plate was situated. I have seen it built near the top of a haystack at some distance from the ground, and also in a clump of bamboo, where the dead leaves of the plant had been used for the fabric.

A captive Dormouse which I once kept as a model, escaping in my room, made a dormitory for itself in the canvas of a sketching umbrella, where I found it fast asleep.

Although apparently sluggish in temperament, the Dormouse at times shows wonderful agility, leaping from branch to branch in a hedge in a surprising manner, and catching hold of the twigs with great dexterity. It is also good-tempered and seldom bites when handled. In habits this animal is mostly nocturnal, though it will sometimes come out in daylight.

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The food consists chiefly of various wild fruits and nuts, whilst insects and grubs are also eaten.

The female produces three or four young at a time in a nursery built for the purpose usually quite near the ground. This is larger than the dormitory made by the Dormouse as a retreat in summer.

Various local names have been given to this animal, such as Sleeper, Sleep-mouse, Seven-sleeper, etc., all descriptive of its hibernating habits.

END OF VOL. I.

